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MARCH / APRIL 1993

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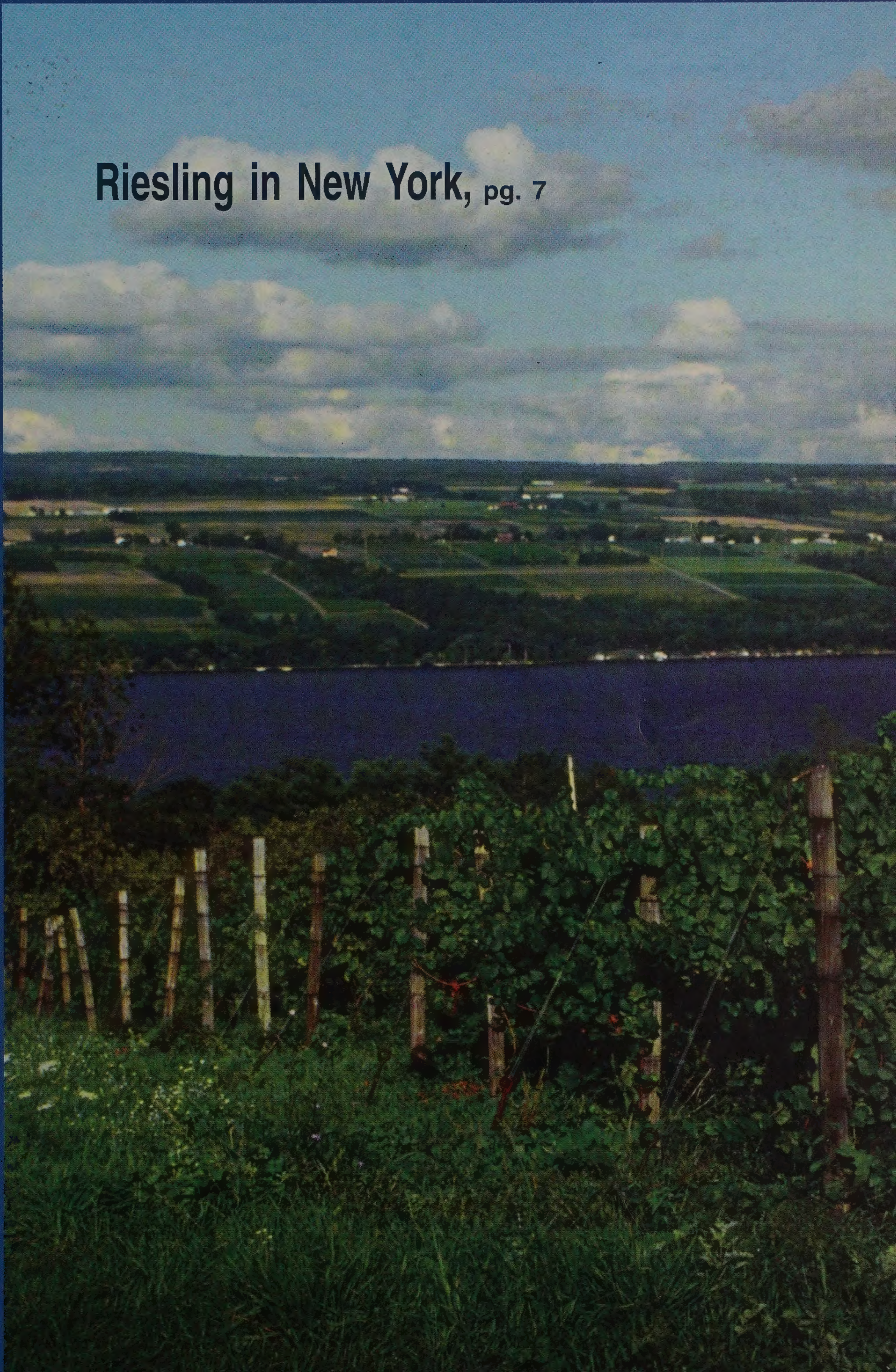

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- **Pascal Chatonnet,** University of Bordeaux, – *Effects of heat on oak* (The chemistry and effects on wine flavor through light, medium, and heavy toasting)
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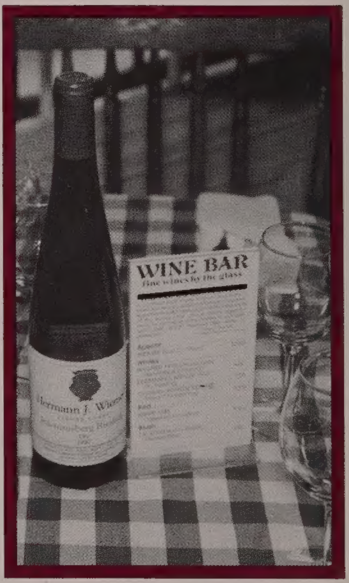
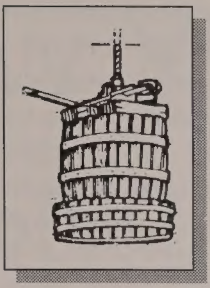


COVER: Vineyards on east and west sides of Seneca Lake in New York.
PHOTO BY: Nanci Ludwig



My chair and the control theory

By Patrick Campbell, owner/winemaker, Laurel Glen Vineyard, Glen Ellen, CA, President, Family Winemakers of California

Twenty-one years ago, I attempted to prove — along with 10 other ardent seekers of the truth and a professor who had devoted his life to the matter — that the chairs we sat on existed.

By the time the seminar ended — a year later — I was no wiser than I was at the beginning, which was not at all. But that's the sort of thing philosophers (or think-they-are philosophers) do with their lives, so I never considered the effort a waste of time.

The exercise was to find an ultimate principle upon which to construct further truths. If we could prove that the chairs upon which we sat existed, then we were in a position to prove that other things existed too. For example, ourselves, or God, or existence itself. I think, therefore I am.

Or in this case: the chair I sit on exists, therefore so do I. And by extension of this truth so does the room in which I sit, and the building in which the room is, and the earth on which the building sits, and so on.

But we never even got to the starting place of the argument: that the chair exists. Thus my personal existence remains suspect to this day, not to mention God's.

Alcohol's existence as a social problem

I bring all this up because I did some reading over the Christmas holidays about current public health research on alcohol problems. I figured that if a change in social policy could put me out of business, I'd better find out something about it. It's preferable to know one's enemies, after all.

I discovered that alcohol abuse is now viewed by cutting-edge public-health types as a social problem, rather than a personal concern. The "over-availability of alcohol" is the problem, not personal responsibility, as far as they're concerned. So instead of promoting treatment and education, they advocate community-based methods — bolstered by social, regulatory, and legislative policy — as the means of combatting alcohol abuse.

Central to the view of alcohol as a social problem is the so-called control theory. The proponents of this notion argue, in effect, that restriction of alcohol availability will reduce alcohol abuse. Less alcohol in the world means fewer problems, they claim. Just like drugs and second-hand smoke, right?

Acceptance of the control theory as a fundamental premise allows a concatenation of conclusions to follow. The next step is to restrict alcohol advertising so the public will want to drink less. Then, on the local level, to limit serving sizes, restrict serving hours, enlist the power of outraged community groups to act as watchdogs, inculcate schoolchildren about the dangers of alcohol, promote "Just say No" campaigns, and so on.

Raising excise taxes will reduce sales further, as will a constant barrage of negative publicity. Then, as consumption drops, so will the number of abusive drinkers, and the world will be a better place.

In short, begin with lowering alcohol availability and end with the elimination of alcohol abuse. Just like beginning with the chair and concluding with the proof of God's existence. Both results are about equally unlikely, although I would put my money on the latter, metaphysics being more rational than illogic, after all.

Uncertainty over the chair's (or my own) existence has not caused me the loss of a single minute of sleep or dollar of income in the past 21 years. But I stand to lose plenty of each if public policy comes to be predicated on the control theory.

For a starter, the United Nations-based World Health Organization and the fed-

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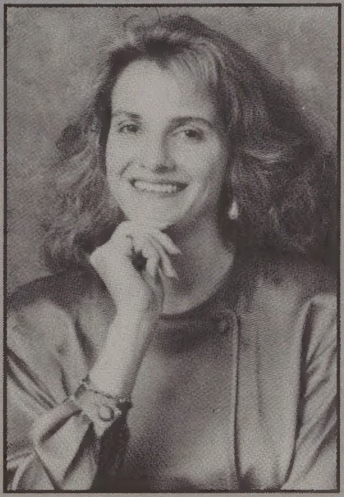

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eral Health & Human Services agency have set as policy goals a 25% reduction of alcohol worldwide by the year 2000. That's not, by the way, somebody else's alcohol they're talking about: It's ***my*** wine, the sweat of ***my*** brow. Demon rum or fine wine — it's all the same to them, and it's all there to be restricted, regulated, legislated, and taxed in the name of social betterment.

The control theory

Let's examine the control theory. On the face of it, the argument that reducing alcohol availability by 25% will lower abuse by the same amount, sounds plausible. That is, until you give it a few seconds' thought.

Think about it for more than 30 seconds and you realize it's a sham, a faulty premise, a cracked cornerstone. To use it as the basis of social policy is to build a house on sand. It makes about as much sense as trying to urge fat people to eat less by reducing the world food supply. Or, in reverse, like trying to cure anorexia by growing the world more food.

The number of potentially abusive drinkers in the human population is 10%. Ninety percent of people have no problem. By reducing the amount of alcohol available, the 10% will still abuse (potentially or actually) and the 90% will drink a little less.

The control theory is indiscriminate: The entire populace is affected equally, both in principle and in practice. Control theory stands in stark contrast to programs targeted directly at the abusive drinker. The former is like broadcasting seeds onto an unprepared field; the latter, like drilling seeds into orderly beds.

Not surprisingly, the control theory originally was formulated to reduce tobacco consumption. With that issue it has some validity, because any reduction in the amount of tobacco is salubrious. This is true, of course, because there is no such thing as a healthful level of tobacco use; all use is abusive. Control theory makes sense here, because when the supply of tobacco is reduced, fewer people smoke, or the same number of people smoke less, or both. Whatever the outcome, the world is healthier.

The same logic does not apply to alcohol for the simple reason that moderate use is not abusive, and is in fact healthful in most cases. As availability is reduced, the abusive drinker drinks no less and the moderate drinker merely lowers consumption. And as taxes are raised, the abusive drinker pays more (or switches to a cheaper alcohol source), and again, the moderate drinker just drinks less.

Only in its ultimate extension — the total restriction of availability, the absolute elimination of alcohol from the world — can the control theory effectively curb alcohol abuse. Prohibition (and Reagan-era drug policy) affords ample testimony to the stupidity and uselessness of this approach.

But if the control theory is illogical, impractical, and doomed to fail, why do well-educated academics and other apparently smart people espouse it? There are several reasons; none have anything to do with alcohol abuse. We'll examine those reasons in Part II. That is, if my chair still is here! ■

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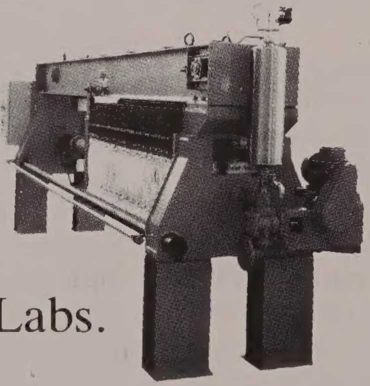

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New York Riesling positioned for eclipse

By Eleanor & Ray Heald

In New York State, producers stand poised to eclipse virtually all New World viticultural regions with their Rieslings," maintains Vinifera Wine Cellars winemaker Peter Bell.

Worldwide since the 1950s, Riesling has been vigorously adopted by many wine-growing regions with a disparate number of climate and soil conditions. This has led to an array of styles and quality levels. "While this is true, it is, however, widely recognized that Riesling is ideally suited to cool to moderate climates, at least for premium wine production," Bell adds. "New York State vineyards in the Finger Lakes region and along the southern Lake Erie shore have superior growing conditions for Riesling.

"The *vinifera* revolution in New York state is still young, and as a result, the selection of appropriate sites, clones, rootstocks, and trellising systems remains hit and miss. I am hopeful that more premium wine drinkers will wake up to the delights of wines other than Chardonnay and Cabernet Sauvignon and provide a much greater market for Riesling — a variety which, in the words of British wine writer Jancis Robinson, is still 'ludicrously unfashionable.'"

PWV interviewed six New York State producers of Riesling to learn the important factors related to premium production of this varietal.

Site advantages

Growing grapes in a cooler climate necessitates discussion of frost damage. "In theory, any location with morning sun may forestall frost problems," Bell contends.

"Air drainage on an individual site is more important than exposure," Woodbury Vineyards' Markus Riedlin counters. "There's an advantage to an eastern exposure because vines get morning sun. On the other hand for Seneca Lake as an example, there's an advantage for vineyards on the east side of the lake because the cold air coming from the west is warmed by the lake waters, even though the lake is only two miles wide.

Glenora Wine Cellars is working with six different vineyard sites ranging from flat to well-sloped. "All of them are dramatically different," reports Glenora's winemaker David Munksgard. "Vineyard management is the key difference and it ranks higher than whether the vineyard is sloping or flat."

"On the western shore of Seneca Lake, there is a band of limestone stretching from north to south," offers Lakewood Vineyard's Chris Stamp. "This 'band' is wide at the northern end, but narrows quickly toward the south. Riesling grows better and has more flavor in this higher pH soil. This is the reason we are forced to plant at a lower elevation (*i.e.*, closer to the lake) to achieve optimum quality."

Scion selections

To Herman J. Wiemer Vineyard, the clonal selection aspect may be a more important consideration than either soil or exposure. "At Wiemer, we purchase Riesling only from growers who have bought scion wood from us (Clone 239 predominantly)," winemaker Dana Keeler states. "This way, I'm secure in knowing with which starting materials I'm working."

Other producers disagreed with this concept. From their perspective, a variety of clones offered complexing elements to the wine. Munksgard and Stamp in particular, remained steadfast in their consideration of site management and slope as more significant than clonal selection.

"Over the years, a large number of different clonal selections of Riesling have been introduced in the Finger Lakes. It would be a nightmare to attempt to sort this out," Cornell University's Thomas Henick-Kling points out, "Clone 239 behaves differently in each microclimate and soil," Riedlin relates. "It's only one factor and may be over-emphasized."

Geisenheim Research Station's Wolf Sponholz offered his perspective: "Clone 239 is popular in all countries growing Riesling," he reports. "The expression of the clone is different in each region depending on the soil and climate. A winery needs to work with clones 10 to 30 years in order to know what they're getting."

Priorities

When asked to detail important elements in order of priority, producers agreed on the following:

- Vineyard management which includes appropriate rootstock to control vigor, canopy manipulation, and shoot positioning. Producers agreed, however, that properly pruning Riesling often eliminates the need to cluster-thin or leaf-pull.
- Climate and soil,
- Winemaking practices,
- Clonal selections which are the base of wine style consistency.

It was also generally agreed that the popular statement "wine is made in the vineyard" is a gross over-simplification.

Style and marketing decisions

"The desired style of Riesling does not dictate when picking occurs," Munksgard contends. "It does, however, modify winemaking decisions." At Glenora, current inventory is monitored and marketing/sales personnel have a fairly good idea what they're going to need from the vintage for the various Riesling styles produced. "We know when these wines are going to be hitting the retail shelf," Munksgard adds.

Glenora's advantage of buying grapes in six different locations and from multiple growers at staggered harvest times was pointed out. Smaller estate wineries have different perspectives.

"If you wish to produce a wine that's ready to release in just six months," David Whiting (Chateau Lafayette Reneau) remarks, "and you harvest the fruit at a high level of maturity, in order to obtain rich early maturing fruit flavors and structure, long skin contact time may be ruled out because of the potential for too much extraction. However, if the fruit is harvested earlier with a more solid acid structure and more crisp fruit flavors, the wine may benefit from longer skin contact time. Longer skin contact in this case, may make the wine more approachable early on. Levels of SO_2 at bottling is also related to style. Understanding market placement is an important issue related to cellar techniques."

PWV thanks Glenora Wine Cellars for hosting the tasting/discussion and the following industry representatives for participating: David Whiting, Chateau Lafayette Reneau; Thomas Henick-Kling, Cornell University Dept. of Food Science/Technology at Geneva, NY; Wolf R. Sponholz, Microbiology Dept., Geisenheim Research Station, Germany; David Munksgard, Glenora Wine Cellars; Phillip Hazlitt, Hazlitt 1852 Vineyards; Chris Stamp, Lakewood Vineyard; Peter Bell, Vinfera Wine Cellars/Chateau Frank; Dana Keeler, Hermann J. Wiemer Vineyard; Markus Riedlin, Woodbury Vineyard.

GLENORA

DUNDEE, NY
DAVID MUNKSGARD, WINEMAKER

Stylistic goals

For wine labeled 'Johannisberg Riesling,' Munksgard seeks forward fruit aromas and flavors that are held in balance by the region's cool climate acid structure.

In 'Dry Riesling,' he strives to achieve citrus and nectarine aromas with a crisp entry and finish. Medium fruit flavors are displayed in a wine destined to complement food.

Achieving complexity

Grapes for both wine styles are picked by taste from multiple vineyard sites and clean juice is a requirement for cold fermentation at 40°F. Skin contact time for both styles is 24 hours before centrifuging with the addition of 3-lb/1,000gal bentonite. Other cellar practice differences between styles are noted under winemaking.

Vineyards

Grapes from vineyards averaging 11-years-old are picked from multiple sites on both eastern and western slopes of Seneca Lake. They are Pendelbogan-trellised and yield approximately 4.5 tons/acre. The major distinguishing fruit aroma and flavor characteristics are green apple and nectarine.

Top soils are Howard gravel with a deep subsoil profile. Vines on 3309 rootstock are spaced 7x9, 700 vines/acre in a north-south row direction on slopes averaging 14%. They are winter-trimmed and spring-pruned. Suckering is done in spring, and top hedging to control the canopy is done in summer.

Vines are first sulfur dusted at four-inch shoot growth. Nova and sulfur rotations are made on a 14-day cycle.

Average harvest parameters range 18° to 21° Brix, 0.8 to 1.0 TA, and 2.95 to 3.3 pH.

Winemaking

After centrifuging, juice is fermented using active dry Prise de Mousse yeast. In 1990, because higher average Brix levels (20.6°) were achieved with balanced acid levels, the Johannisberg Riesling was neither chaptalized nor acid-adjusted. However, in 1991, after juice centrifuging, chaptalizing to 20.5° Brix and acid adjustments with malic and tartaric acids to 0.8 TA were made.

In 1990, Johannisberg Riesling fermentation lasted 20 to 25 days and in 1991, it took 30 to over 40 days to complete.

The 1991 Dry Riesling was chaptalized after juice centrifugation to 20.5° Brix, but it was not acid-adjusted. Fermentation at 40°F lasted 30 to 40 days.

Wines are fined with PVPP during and after fermentation and centrifuged off the fining agent. They are bottled as soon as possible between November and February. A BECO Sterile-40 membrane is used on the bottling line.

Characterized by light spicy, nutmeg, anise, citrus, and floral notes, with green apple and apricot flavors, the Dry Riesling is bottled at 30ppm free and 150ppm total SO_2. About 1,300 cases of this wine were produced with a bottling TA of 0.7, 3.06 pH, and 1.0% RS. It is released one to three months after bottling.

About 1,800 cases of the Johannisberg Riesling was bottled at the same SO_2 levels as the Dry Riesling, but with a TA of 0.8, 3.02 pH, and 2.0% RS. It is released immediately, or at the latest, in three months. It has the aromatics of nectarines, papayas with floral notes. Flavors are distinctly pineapple and peach.

Lakewood Vineyards

WATKINS GLEN, NY
CHRIS STAMP, WINEMAKER

Stylistic goals

At Lakewood Vineyards, the goal is to produce Riesling with maximum varietal intensity. Late harvest characteristics are avoided and the wine is finished off-dry between 0.9 and 1.6% RS depending on the year. The wine is crisp edged with bright floral aromas and ripe melon with light earthy flavors.

Achieving complexity

While Lakewood Vineyards produces nearly all its own grapes, about 20% to 30% of the Riesling is purchased from two growers on Seneca Lake that have western exposure (opposed to the winery's eastern exposure). The distinctly different characteristics of the sites both complement and add complexity to the home fruit.

Western-exposure fruit tends to exhibit more melon characteristics, perhaps because the vineyards receive more direct afternoon sun. Grapes, regardless of source, are given eight to 12 hours skin contact at about 40°F. They are pressed at no more than 0.75 bar.

Vineyards

Vines averaging 10-years-old are planted on the west shore at the south end of Seneca lake. Planted 7x7, at 690 vines/acre, in a north-south row direction on a 6% slope, the fruit tends to be floral with faint earthy tones and generous acidity in the range of 0.78 to 0.88 TA. Yields average five tons/acre.

The trellising system provides an umbrella over the top wire and there are two to three trunks for renewal. The typical vine has four canes with 12 to 15 buds/cane. Vines are suckered prior to bloom.

The soil profile is light with a few stones and good drainage.

At budbreak and again two weeks later, Bayleton and sulfur are applied. Sevin, Bayleton, and sulfur are used pre-bloom. The first post-bloom spray is sulfur and Penncoreb. The second is Bayleton, sulfur, and Penncoreb followed every two weeks with sulfur and Bayleton. All spraying ends mid-August.

The general harvest parameters are 18° to 22° Brix, 0.89 to 1.02 TA, and 3.05 to 3.2 pH.

Winemaking

After racking and warming, juice settled one to two days at 40°F is inoculated with active dry Prise de Mousse or Epernay II yeast. DAP is added when needed. Maximum fermentation temperature reaches 65°F and fermentation completes in 11 to 14 days.

The must is generally not chaptalized. Acid adjustments are rarely necessary, but when needed, it is done in January with $KHCO_3$ or K_2CO_3 after protein stability fining with bentonite in December.

The wine receiving an EK or EKS filtration is bottled in early spring at 35ppm to 45ppm free and less than 100ppm total SO_2. About 400 cases are produced with bottling TA between 0.77 and 0.85 g/100ml, 3.2 pH, and RS between 1.1% and 1.55% It is bottle-aged three to six months before release.

Dr. Konstantin Frank

Hammondsport, NY
Peter Bell, winemaker

Stylistic goals

With both the 'dry' and 'semi-dry' style, Bell aims to produce a fresh, forward wine showcasing clearly defined varietal character — a wine giving the appearance of minimal interference between grape and bottle.

Achieving complexity

Bell prefers to pick Riesling when it's pushing toward maximum ripeness, using flavor, sugar, and disease pressure as criteria. A typical juice analysis is 20° to 22° Brix, 0.8 to 0.9 TA, and pH 3.10. Noble rot is gladly accepted because even a small amount adds an attractive note to the wine — but hints of bunch rot or desiccation are avoided.

Vineyards

All Riesling is estate-grown on the west side of Keuka Lake. Vines range from 10 to 32-years-old with an average of 14 years. A mixture of clones 90, 239, and 356 are planted on SO4, 1613, and 5BB rootstocks, spaced 6x9, at approximately 800 vines/acre in a north-south row direction. To date, differences among the clones have not been qualified, but the present mix offers intense varietal character, good natural acid, *gout de terroir*, and the possibility of well-developed *botrytis cinerea*.

The soil is poorly-drained, shallow Mardin Channery silt loam. Vineyards have slopes ranging from 8% to 25%. Vines are trained on a simple three-wire Kniffen system yielding 3.5 tons/acre. They are cane-pruned with multiple trunks available for renewal.

After budbreak, wettable sulfur and Mancazeb are applied intermittently depending on weather conditions. Captan, Mancazeb, and Nova are used in late season along with two Rovral sprayings.

Winemaking

Grapes are principally machine-picked and crushed within three to four hours of harvest. Sulphur dioxide (70 to 80 mg/L) is added at the crusher. No skin contact is employed. Crushed grapes are pressed in a membrane press with rice hulls and pectolytic enzyme as press aids. The press cycle is extended as time allows to maximize the volume of free-run and lightly-pressed juice.

Bell places heavy emphasis on juice tasting during the press cycle. He believes there is a strong urge among winemakers with programmable presses to set the program and walk away, but stresses that even a sophisticated, state-of-the-art press does not know what flavors are evolving in the juice as the grapes are being pressed.

When the juice begins to taste flat and show obvious phenolics (in the range of 120 to 130 gal/ton), a new fraction is started by switching to another settling tank. Further addition of SO_2 is made to the juice pan since all previously added SO_2 is in the free run portion.

Juice is settled at 50°F for 24 to 36 hours. During this period, the free SO_2 is 15 to 20 mg/L. The juice is racked via a heat exchanger, warming it to about 65°F and inoculated with either Prise de Mousse or Epernay II yeast. DAP is added at 300 mg/L. Fermentation lasts about three weeks at 65° to 68°F. Bell has found that fermentations at colder temperatures become sluggish, and the resulting wine lacks 'vinosity.'

A light bentonite addition is made at about 10° Brix with additional bentonite added to achieve heat stability after fermentation completes.

Fermentation is stopped at the desired sugar level by active chilling followed by SO_2 addition. Wines are cold stabilized and blended to two separate lots; a 'dry' style with about 10g/L sugar and a 'semi-dry' style of about 25g/L. Sweetness is increased with the addition of small amounts of sterile-filtered Riesling juice.

Pad filtration to 0.45μ is used followed by 0.45μ membrane to the bottle. Currently about double the quantity of dry style is being produced. Bell contends that consumers are increasingly preferring the drier style. Both spring bottlings receive about one year of bottle-age before release. SO_2 levels are 30ppm free and 120ppm total with TA of 0.80, 3.12 pH, and 1.1% RS for the 'dry' style.

Both wines exhibit aromas of fresh and dried flowers, apples and apple blossoms, lime and lime zest with hints of honey. They display lively acidity, significant weight from alcohol and sugar and good palate length.

Widmer.

Chateau Lafayette Reneau

Widmer's Wine Cellars,
Naples, NY
Bonnie Abrams,
assistant winemaker,

Chateau Lafayette Reneau,
Hector, NY
David Whiting, winemaker,

Stylistic goals

The stylistic goals of production with Widmer's/Chateau Lafayette Reneau Riesling are crispness with a combination of apple, pear, and peach fruit elements. A flowery, varietal Riesling nose

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and palate are also desired.

The wine should be perceived as smooth and complex on the palate with a crisp acid balance, sweetness just below perception threshold, and light phenolics.

Achieving complexity

Using fruit with solid Riesling structure, Whiting and Abrams rely on malolactic fermentation, skin contact, juice reserve, and late harvest blending fractions to contribute to complexity.

Vineyards

Grapes are grown on the east side of Seneca Lake. About 80% are 10-years-old and 20% are four-years-old. The location offers strong lake effect and good air drainage. Harvesting clean fruit in a wide range of maturity is possible. Spicy, flowery aromas are site typical.

Vines (clone 239 predominantly) are spaced 6x9 on 3309 rootstock in both north-south and east-west row directions on 7% to 10% slopes. They are trained on a three-wire vertical trellis with two to four canes. Spur- and cane-pruning are employed. Two to four canes are left with eight to 14 buds and two to six spurs have one to three buds.

Vines are kept relatively small with some shoot-topping necessary in summer. Two weeks after set, leaf-pulling is done on vines developing a heavier canopy. Crop levels are two to four tons/acre.

Silty, clay loam soils three to six feet in depth over shale are medium-well drained.

A standard preventative program for grape diseases is employed.

A typical harvest widow is 19° to 20° Brix, about 1.0 TA, and 3.0 to 3.2 pH. At picking, predominantly green leaves remain on the vine. Some *botrytis*, offering complexity, has developed.

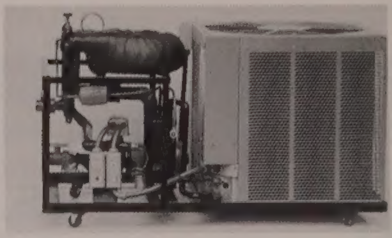
Winemaking

After settling for 24 hours at 45°F, juice is inoculated with active dry Epernay II yeast. DAP is added as needed. Fermentation completes in 40 days with maximum temperature reaching 65°F.

At 3° Brix, inoculation with malolactic bacteria strains is made on separate lots enabling five to 20% of the total production to complete ML. This technique improves the wine's body and mid-palate while contributing to a smooth finish.

Chaptalization and acid adjustment are generally unnecessary.

Glycol Chillers



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Post-fermentation, the wine is bentonited for stability and fined with PVPP, gelatin or casein, if needed. The wine receives a 0.45µ membrane cartridge filtration before bottling. SO_2 levels at bottling are 35ppm free and 90ppm total. TA is 0.72, pH 3.1, and 0.7% RS. The wine is released in two months.

The predominant characteristics are pear, apple, and nectarine aromas with apricot, peach, and lemon flavors. ML characteristics are evident in the background.

Hermann J.Wiemer

DUNDEE, NY
DANA KEELER, WINEMAKER

Stylistic goals

At Wiemer, production of an off-dry (0.4% to 0.8% RS) with substantial body and mouthfeel is the primary goal. The wine should exhibit lemon and Granny Smith apple flavors and be food complementary.

Achieving complexity

This element of the wine varies with a given vintage, however, warmer fermentation temperatures (without temperature control) offer by-products of yeast metabolism. Keeler believes that temperature-controlled fermentation at a single temperature produces monochromatic results.

Vineyards

Vines (clone 239) averaging nine-years-old on SO4 and 3309 rootstock are located on the west shore of Seneca Lake. Here, Keeler contends the acid structure is ideal to provide a wine with firm backbone to accompany ripe fruit characteristics.

Vines are spaced 6x9 on a 3% slope. They are trained on a three-wire trellis with catch wires and are cane-pruned. Suckering is done at ten-inches of shoot growth and summer hedging controls the canopy. Average yield is three to 3.5 tons/acre.

Soils are glacial till with both silt loam and a gravel/sand mixture over shale.

Harvest parameters average 18.5° Brix, 0.98 to 1.05 TA, and 3.0 to 3.1 pH. Basically, fruit is picked on aroma and taste assessments.

Winemaking

Overnight juice settling at ambient temperatures is followed by inoculation with active-dry Prise de Mousse yeast. If needed, juice is chaptalized to 21.5° Brix. Acid adjustment is not needed.

Maximum fermentation temperature reaches 65°F with fermentation completing in ten days.

To soften the wine, ageing on gross lees for two to three weeks follows fermentation. The wine is not fined, but is given a 0.65µ pad filtration and a 0.45µ membrane filtration before bottling in May or June.

SO_2 levels at bottling are 50 to 60ppm free and 120 to 150ppm total. About

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3,000 cases are bottled with TA of 0.7, 3.1 pH, and 0.7% RS. It is released in nine months and exhibits herbal, pine lemon aromas with a lean, angular structure and appley, lemon flavors.

Woodbury VINEYARDS

DUNKIRK, NY
MARKUS RIEDLIN, WINEMAKER

Stylistic goals

Attempts to produce a wine reflecting the soil and climate are the goals at Woodbury. Riedlin considers it his job to respect the fruit nature provides and to enhance those characteristics with proper winemaking techniques.

Achieving complexity

Avoiding overcropping of vines is the principal fruit complexing element. Older vines available to Woodbury produce fruit with varietal characteristics and if lots are treated separately in the cellar, enhanced complexity is a direct result.

Vineyards

Woodbury was the only non Finger Lakes winery interviewed. Estate vineyards are located on the south shore of Lake Erie with a north-west exposure. Soils are Chenango gravelly loam.

Vines (clone 239) averaging seven-years-old, planted on 3309 and SO4 rootstock are spaced 4x8, with 1,361 vines/acre in a north-south direction on a flat site.

German Pendelbogen trellising is used. After pruning, 15 to 25 buds/vine remain. No additional canopy management is necessary.

Two pre-bloom (with Mancozeb, sulfur and sometimes Nova) and five post-bloom sprays (with Mancozeb and Captan) are made. Before clusters close, Rovral is applied. End-of-the-season sprays are a typical Bordeaux mixture.

Harvest decisions are made in a range of 18° to 20° Brix, 0.80 to 1.0 TA, and 3.1 pH.

Winemaking

Must settles for two to three days at 54° to 59°F before racking and inoculation with active dry Prise de Mousse yeast. If necessary, chaptalization is done to 21° Brix.

Fermentation completes in ten days with a maximum temperature of 75°F.

After fermentation completes, and again after the first racking, the wine is fined with KWK. A sterile filtration and a 0.45µ membrane filtering is done before bottling in spring.

About 800 cases of wine showcasing apple and melon aromas with mature fruit and crisp acidity is bottled with 35ppm free and 100 ppm total SO_2. The TA is 0.84, pH is 3.1 and RS is 0.7%. The wine is released to market based on demand. ■

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PART I

HISTORY AND CURRENT STATUS:

Pierce's disease

**By Alexander Purcell,
Dept. of Entomological Sciences
University of California, Berkeley**

Pierce's disease is one of the few vine diseases that is fatal to grapevines. For this reason, Pierce's disease usually gets the attention of anyone who's encountered it or seen in it in neighboring vineyards.

Because the bacterium that causes Pierce's disease was only discovered about 20 years ago, the disease used to be known as 'the mysterious disease.' Relatively little research has been done on the disease, compared to the more common fungal diseases of grape. But despite our ignorance of many aspects of Pierce's disease, it can no longer be called a mystery.

Part I of this two-part series highlights the history and impact of Pierce's disease in California and major research findings on the bacteria that causes the disease. Part II will cover how the disease is spread and what to do to prevent it.

The California vine disease

The sudden appearance of a new and dramatically virulent grapevine disease in southern California in the 1880s caused great alarm within two years of its first outbreak. Originally called the Anaheim disease, it caused sudden and devastating losses to the prosperous new wine industry in Anaheim and other communities in the Santa Ana Valley. By 1891, losses were estimated at over 25,000 acres in the Los Angeles basin. Commercial vineyards never reappeared in Anaheim and other neighboring communities.

Except for two major epidemics since then, Pierce's disease continues to be found in 'hot spots' in vineyards in coastal regions, with more sporadic outbreaks in the Central Valley. The history of research on Pierce's disease consists of decades with little activity and scant progress interspersed with shorter periods of rapid and impressive advances.

The first major advance was Newton Pierce's studies during the 1880s of what he called the 'California vine disease.' In the second plant disease bulletin of the fledgling U.S. Bureau of Agriculture, Pierce described the symptoms of the disease and its behavior in the field.[1]

Pierce discounted other known pathogens and disorders, but could not prove his theory that an undetected microbe caused the disease. It was ironic that Pierce then was one of the few pathologists well-trained in plant bacteriology, yet he did not detect the bacterium that was to be later identified as the causal pathogen. Pierce is considered by some to be California's first plant pathologist.

Pierce's disease rediscovered

In the mid 1930s, outbreaks of a similar disease in Tulare county prompted renewed studies of a similar disease by William Hewitt, a UC Davis graduate student. He confirmed the disease as that studied by Pierce and renamed the disease in his honor. Hewitt consistently transmitted Pierce's disease by grafting and concluded that the pathogen was probably a virus and was limited to the xylem, the water-conducting tissues of plants.

Grafting obviously was not responsible for natural spread. Hewitt recruited the help of Berkeley entomologists who were able to show that sucking insects that feed on the xylem, were the vectors responsible for natural spread.

In the 1940s, Norman Frazier (then a graduate student) and other entomologists identified three species of sharpshooter leafhoppers as the principal vectors in California, based on the constant association of these sharpshooter species with localized outbreaks of Pierce's disease.

A state program to remove vines with Pierce's disease in large scale experiments failed to slow the subsequent spread of Pierce's disease. Excellent control of vectors in Napa Valley vineyards with the new insecticide DDT also failed to have any perceptible benefits in reducing Pierce's disease. It was assumed that this was probably because vector transmission was very quick and efficient.[2] In hindsight, the failure of insect control and removal of diseased vines to slow further disease spread also was evidence that vine-to-vine spread of Pierce's disease was not significant.

Another major finding in the 1940s was that many plants besides grapevines could harbor the Pierce's disease 'virus.' Pierce's disease in the southern Central Valley usually was more prevalent next to alfalfa fields with alfalfa dwarf disease. Experiments with insect vectors confirmed that both diseases were caused by the same still unknown pathogen. More surprising was the enormous number of other plant species from which vectors could acquire the Pierce's disease 'virus.'

Of 100 plant species that were tested by Freitag and others, 75 proved to be hosts from which sharpshooters could acquire the pathogen.[3] Only a few plants showed any symptoms after exposure to infective sharpshooter leafhoppers. Sharpshooters collected in areas remote from agriculture transmitted Pierce's disease to test grape plants.

The findings of many alternative plant hosts of the Pierce's disease pathogen and the high rate of infectivity of sharpshooters collected from natural vegetation supported the idea that most disease spread into vineyards came from the outside.

Research in California inspired new studies in the southeastern U.S. on phony peach disease, whose causal pathogen also had been determined by grafting experiments to be limited to xylem tissues. The same kinds of insects — xylem-feeding leafhoppers, called sharpshooters — were shown to be vectors. A strain of *Xyella fastidiosa* that does not cause disease in grape was verified in 1981 as the causal pathogen of phony peach disease.[4]

Hewitt found that Pierce's disease was widespread in Mississippi, Florida, and other southern states. He proposed that this region was the evolutionary 'home' of the pathogen because the wild grape species there were resistant. Many wild grape species such as muscadines (*Muscadinia rotundifolia*) were infected but not diseased, yet European vines (*Vi-*

tis vinifera) succumbed to Pierce's disease soon after planting. Thus Pierce's disease was another limitation to viticulture in the southeast. But unlike phylloxera and fungal diseases, there were no effective controls available.

Research in Florida had been motivated by a desire to breed resistant grape varieties that would allow a new fruit industry to develop there. The goal of new table varieties of *V. vinifera* has not been realized, but cultivars of muscadines and hybrid wine varieties have emerged from the program.

Renewed research after 1970

Pierce's disease research resumed in the early 1970s with simultaneous discoveries, by Austin Goheen and George Nyland at UC Davis and by Donald Hopkins in Florida, that a bacterium — not a virus — caused Pierce's disease. Michael Davis at Berkeley devised special media and cultured the bacterium. This, in turn, led to serological tests such as ELISA (enzyme-linked immunosorbent assay) to detect the bacterium in plants and insects. Use of these serological methods further confirmed that many weeds and wild plants were infected by the causal bacterium.

Research in my lab described some of the essential features of how insects transmit the bacterium.[5] The bacterium was named *Xylella fastidiosa*. The name reflects where the bacterium is found in plants (xylem) and the narrow range of conditions in which this 'fastidious' bacterium will grow in artificial cultures. Currently, there is only one species in the new genus *Xylella*. Strains of similar bacteria that cause diseases of peach and other deciduous trees in the southeastern U.S. are considered to be the same bacterial species.

Don Hopkins had studied Pierce's disease at the grape-breeding station in Leesburg, FL for over 20 years when he categorized strains of *X. fastidiosa* into two groups. Strains in the first group cause Pierce's disease; those in the second group do not infect or cause disease in grape but are pathogens in some other species of plants.[6]

Hopkins also found that after prolonged growth on artificial media in the laboratory, some bacterial isolates lost their ability to cause disease (virulence) to grape. This loss of virulence corresponded perfectly with the inability of 'nonvirulent' isolates to move systemically within the plant. He also found that plant growth regulators such as indoleacetic acid and kinetin, which retard leaf senescence, also slowed bacterial growth and symptoms in tolerant cultivars of muscadine but not in susceptible *vinifera* cultivars.

During the 1980s, Paul Goodwin at UC Davis found that the disease symptoms, beginning with zones of yellowing and discoloration of foliage, followed by the progressive dying of these tissues, were caused by mild but chronic blockage of water movement by masses of bacteria embedded in gums in the xylem. Previously, these symptoms had been ascribed to a bacterial toxin. Goodwin's work supported Hopkin's findings that plant growth regulators (Etephon, abscisic acid) that promote senescence of grape foliage increased both bacterial growth and symptom severity.

My research in the 1970s found that

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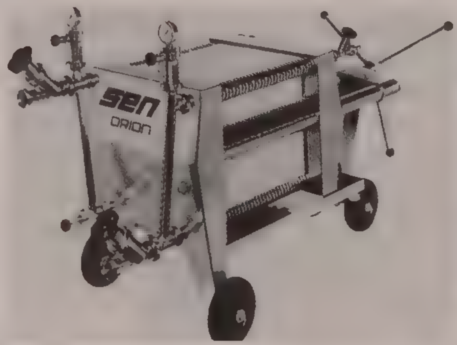
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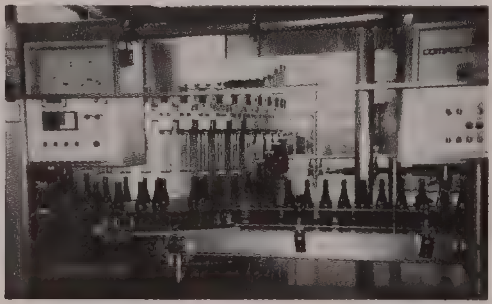
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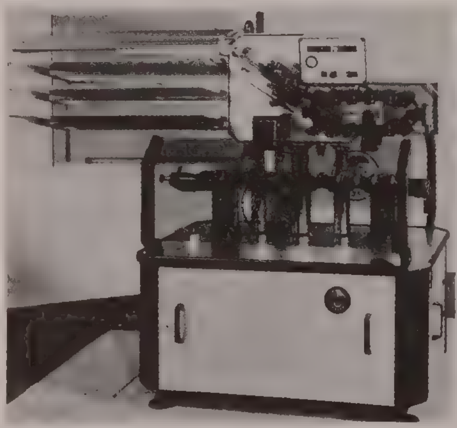
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many infections of X. *fastidiosa* can completely die out during winter dormancy in the field or following freezing treatments of potted vines in the lab. These results might explain the 'winter climate' shape of the distribution of Pierce's disease in the U.S.

Pierce's disease is most severe in Florida and the southeastern states along the Atlantic Ocean and Gulf of Mexico. The disease is less prevalent where winter temperatures are colder, such as at higher altitudes, farther inland from ocean influences, and at more northern latitudes.

The effects of low winter temperatures on bacterial survival are probably indirect because bacterial cultures survive freezing very well in the lab. Secondly, field experiments showed that the earlier in the growing season that vines are inoculated by insect vectors, the greater the chance that the resulting infections would survive through the following winter. Few late season (after June) infections persisted until the following season.

Theoretical (mathematical) models have predicted unrealistically high rates of infection, unless corrected for overwinter recovery. This was a key point in understanding why vector control with insecticides was so ineffective in preventing disease spread and why grape varieties differed in susceptibility. Part II will discuss the latter points in greater detail and the reasons why vector control has only limited success in reducing disease spread and why some varieties have higher rates of overwinter recovery from infections of *Xylella fastidiosa*.

Importance and potential in other countries

Studies of X. *fastidiosa* have expanded well beyond California and Florida, but the number of plant pathologists and especially entomologists devoting major efforts to research on X. *fastidiosa* is still small.

Ironically, there is little research on X. *fastidiosa* in most of the southern states of the U.S. or in Central America because the diseases kill susceptible crops such as grapevines so quickly that they are not economically viable crops. The leaf scorch diseases of trees such as oak, elm, maple, and sycamore that are caused by various strains of X. *fastidiosa* may eventually be recognized as the most economically damaging ones overall as their extent and impact become better known.

Xylella fastidiosa has only been reported as an established pathogen in the Americas. It has been confirmed in Mexico, Costa Rica, and Venezuela. In 1988, Pierce's disease appeared in southern France.[7] The attempts to eradicate the disease by removing the entire affected planting appears to have succeeded, but concerns over possible new introductions of X. *fastidiosa* remain high.

A new *Xylella*-associated disease of citrus, citrus variegated chlorosis, appeared in Brazil in 1987/88 and has grown in importance rapidly since then. It would not be surprising if X. *fastidiosa* occurs in other countries but is simply not yet recognized.

In the 1970s, a 'new' disease, almond leaf scorch, was found to be caused by X. *fastidiosa*. Actually, almond leaf scorch had been present in California for

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many years but not recognized as a distinct problem. The fact that this connection was overlooked for so long, even in a region relatively familiar with diseases caused by *X. fastidiosa*, illustrates why one should expect 'new' *Xylella* diseases to be discovered in the future. As more pathologists become aware of the extent and importance of the many plant diseases caused by *Xylella fastidiosa*, research should increase.

The future

The genetics and physiology of *X. fastidiosa* are still little understood. In this era of molecular genetics, the problem is bound to lead to new research which will improve our understanding of the diseases caused by this bacterium.

A Maryland-based biotechnology company, Crop Genetics International, is developing genetically-engineered 'endophytic' bacteria to harmlessly colonize plants and protect them from insects that feed on plant tissues occupied by the bacteria.

Endophytes are bacteria that multiply and spread in plants. One such bacterium (*Clavibacter xyli*) has been engineered to produce a toxic protein specific to certain insects.

It is conceivable that, with greater understanding, someday *X. fastidiosa* may be genetically-engineered and manipulated to play a similar role in plant protection, perhaps even against other pathogenic strains of the same bacterial species.

The ultimate objective of all these research efforts is to find effective ways to control the diseases caused by *X. fastidiosa*. Like any area of research, most new ideas turn out not to be feasible or correct. But every now and then, one does prove to be productive and justifies all the efforts. Research does not guarantee progress, but no research insures no progress. ■

Part II will describe how Pierce's disease spreads in California, why traditional pest and disease control methods are ineffective, and what can be done to prevent or minimize the spread of Pierce's disease.

References

1. *Pierce, N.B. 1891. The California Vine Disease. U.S. Bureau of Agriculture, Vegetable Pathology Bulletin 2.*
2. *Winkler, A.J. (editor), Hewitt, W.B., Frazier, N.W., and Freitag, J.H. 1949. Pierce's disease investigations.* **Hilgardia** *19: 207-264.*
3. *Freitag, J.H. 1951. Host range of Pierce's disease of grapes as determined by insect transmission.* **Phytopathology** *41: 920-934.*
4. *Wells, J.M., Raju, B.C., Thompson, J.M., and Lowe, S.K. 1981. Etiology of phony peach and plum leaf scald diseases.* **Phytopathology** *71: 1156-1161.*
5. *Purcell, A.H. 1989. Homopteran transmission of xylem-inhabiting bacteria. Chapt. 9 in* **Advances in Disease Vector Research**, *Springer-Verlag, New York.*
6. *Hopkins, D.L. 1989.* Xylella fastidiosa*: Xylem-limited bacterial pathogen of plants.* **Annual Review of Phytopathology** *27: 271-290.*
7. *Boubals, D. 1989. Attention! La maladie de Pierce arrive dans les vignobles d'Europe.* **Progrés Argricole et Viticole** *106 (4): 85-87.*

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ROOTSTOCK
1992 ASEV Proceedings available from ***PWV*** Bookshelf, on page 52.

Crown gall disease on grapevines

By Thomas J. Burr, Plant Pathology Dept. Cornell University, Geneva, NY

Crown gall disease affects over 200 species of plants and is caused by a bacterium, *Agrobacterium tumefaciens*. In grape, the disease is caused by a specific sub-type of the pathogen called biovar-3, (a new species of *A. vitis* has recently been proposed).

The bacterium infects through wounds by attaching to the plant cells and transferring a portion of its DNA to the plant. This bacterial DNA causes the plant to produce abnormal levels of growth hormones resulting in the formation of galls, tumor-like growths.

Galls are most common on the lower trunks of vines, but may also develop on canes (aerial galls) or at grafting and budding sites. In the nursery, galls may develop at basal ends or disbudded nodes of rooted cuttings, and at graft unions. Galls can restrict sap flow in the plant and young, infected plants may be stunted and develop chlorotic foliage.

Biovar-3 also causes necrotic decay of young grape roots. This decay is not caused by other biovars of *A. tumefaciens* when they infect other plants. I believe that root infections can provide a means by which biovar-3, can enter the vine and become systemically established.

My research group has shown that root decay is associated with the production of a pectic enzyme (polygalacturonase) by biovar-3. We do not believe that other biovars of *Agrobacterium* produce this enzyme. Polygalacturonase also appears to be involved in gall formation.

An important characteristic of biovar-3 is that it survives systemically within healthy-looking grapevines. It can be isolated from sap when the vines are bleeding or from xylem extracts or callus tissues on cuttings.

Biovar-3 has been isolated systemically from several cultivars and rootstocks of grape worldwide and we believe that the ability to survive within vines accounts for the spread of the pathogen in propagation material. It will survive in apparently healthy vines until the proper wound conditions occur, leading to infection, and at which crown gall disease can develop.

Crown gall is most severe in cold-climate regions (as a result of cold injury to vines) and on cultivars that are relatively sensitive to freeze injury. These include many important *Vitis vinifera* cultivars, some French hybrids, and American cultivars.

We do not know why freeze injury is such a predisposing factor for crown gall. We know that injury is necessary for infection and that the plant cells that are involved in wound healing are most susceptible to infection. However, why freeze injured sites have most of the gall is interesting. I never see gall at pruning sites and rarely at cultivation injury sites. It can be severe at grafting and budding sites.

Interestingly, in South Africa (and I understand Israel and Jordan as well) gall is worse in the very hot climate sites, suggesting that there may be injury from the heat.

Rootstock susceptibility

Different rootstocks and scion cultivars have been compared for susceptibility to crown gall. Some rootstocks, including Couderc 3309, 101-14MGT, Riparia 'Gloire' and some with *V. amurensis* parentage, have been found to be relatively resistant to crown gall, whereas Richter 110, 420A, Paulsen 775, and Dogridge were highly susceptible. Even a relatively resistant rootstock, however, may not prevent the disease from developing in scion wood, if some bacteria survive and move from the rootstock into the scion.

Researchers at the University of Maryland continue to evaluate the susceptibility of different grape varieties and rootstocks to a diverse group of *Agrobacterium* strains. Resistance ratings are determined by inoculating the different grapes with a diverse group of grape crown gall strains and measuring the frequency and size of galls and the survival of the bacteria in the vine.

A. tumefaciens biovar-3 has not been detected in non-vineyard soil. However, when infected vines are removed from soil, the bacterium may persist in the decaying root and cane tissue for at least two years. The length of survival time will depend on the initial population of the pathogen and on how quickly the vine residue decays. Therefore, soil inoculum in old vineyard sites may be a significant factor in causing crown gall on replanted vines.

In my experiments, root pieces were within the top eight inches of soil. My impression is that the pathogen will survive as deep as root pieces can be found. In California, this may be several feet. Over time, the level of survival will decline making soil inoculum less important in relation to contaminated planting material.

I believe that most of our severe crown gall incidences are the result of pathogen coming with plants. This has resulted in the last 15 years where many new vineyards have been planted in regions that were traditionally not viticultural regions (Long Island-New York, New Mexico, Washington, Virginia, and regions of the midwest and southwest). I believe that if the same plants were planted in areas of California where no freeze injury occurs, crown gall would not have developed.

Eradication efforts

My research group has focused on the biology of the pathogen and on development of control strategies. A method for indexing propagation material was developed that first involves isolation of the pathogen on a semi-selective culture medium. Strains of bacteria that resemble the pathogen are then verified serologically with a monoclonal antibody that is specific for biovar-3. This general approach can be used on dormant cane cuttings and on plants produced in tissue culture.

We also recognize the need for producing crown gall-free vines. Two approaches have been tried for this purpose: heat treatment of dormant cuttings, and production of plants by shoot-tip or meristem culture. Several hundred vines grown from shoot tips or meristems have been indexed, and thus far, all have been found to be free of the pathogen.

Although heat treatments are promising, we have not yet determined the proper temperature/time regime to completely eradicate the bacterium. The number of infected plants is greatly reduced with a treatment of 50°C (122°F) for 30 minutes (at least 75% reduction), or 60 minutes (90% reduction). However, in tissues with high levels of the pathogen, even a treatment of 50°C for 90 minutes (94% reduction) or 55°C for 30 minutes (96% reduction) did not completely eradicate it. We are continuing to test the potential of heat therapy.

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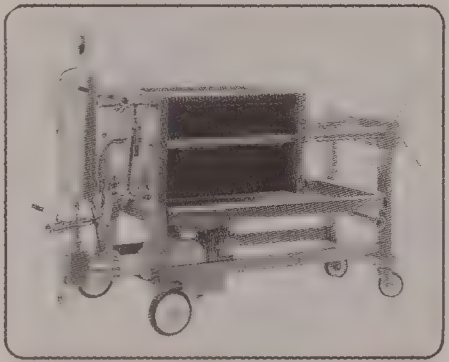

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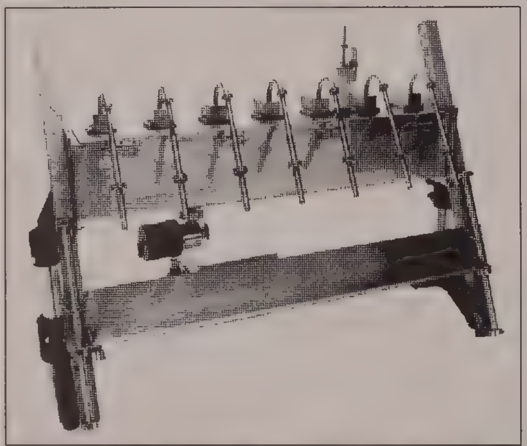

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Control efforts

Chemical control of crown gall has not been successful. Several antibiotics and antibacterial compounds have been applied to the surface of galls and to sites at which galls have been removed. However, none of the treatments have provided control. This is not surprising since the bacterium is systemic in vines and, although these chemicals may kill bacteria that they come in direct contact with, they do not affect the rest of the bacteria residing throughout the vine.

In vineyards where galls were removed and trunks were treated or not treated with different antibacterial chemicals, new galls often formed at the treated and untreated sites the following year. This was especially common when the trunks were freeze-injured during the winter following the chemical treatment, thus providing conditions conducive for infection by bacteria that live within the vines.

Biological control is another area of research that is being investigated. Because the pathogen can persist for years in vine residues in soil, clean vines that are planted in old vineyard sites may become infected by the soil inoculum. On many crops, biological control of crown gall has been achieved with a nonpathogenic bacterium (strain K84) that produces an antibiotic which prevents infection by the pathogen. Unfortunately, this biological control does not work on grape crown gall because biovar-3 is not sensitive to the antibiotic that is produced by strain K84.

We are attempting to develop a treatment that, if applied to vine roots at planting time, would protect vines from infection by soil inoculum. Other laboratories have also been searching for biological controls for crown gall on grape and we are in the process of testing those potential biological control strains that have been reported to be effective. Some show activity in the laboratory and greenhouse for controlling the disease on grape and we are determining how to use them for optimum effectiveness, in the vineyard. ■

(Edited from presentation given in the "Nursery, Laboratory, and Vineyard Strategies for Grapevine Improvement" conference sponsored by Agritope, Inc., August, 1992, Napa, CA.)

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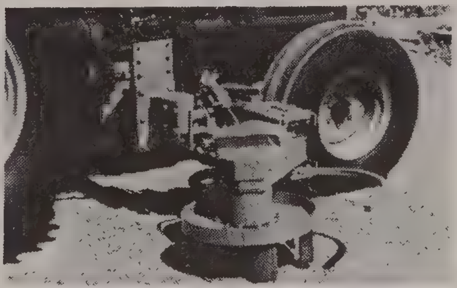

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PART I

FOCUSED HIRING:

Identifying the ideal candidate

By Carolyn Silvestri,
The Personnel Perspective

If you are a winery owner or manager who has done your share of hiring, this scenario might have a familiar ring:

> During the job interview, all indications were that the candidate sitting before you was the perfect person for the position. This applicant was the most qualified and the most experienced, and had impeccable credentials and a professional demeanor. Best of all, the person's references were glowing. Believing you had found your man, you offered him the job, and he went on the payroll.
>
> Two weeks later, however, this match made-in-heaven was headed in the opposite direction. The new employee struggled to keep up with the workload and resented taking on any new tasks. Co-workers commented frequently about the new employee's less-than-pleasant attitude. Finally, the employee came to you complaining that your expectations were unreasonable and that changes would have to be made or he would have to leave.

Unfortunately, this and similar disruptive and frustrating incidents happen more often than you might think. Furthermore, hiring the wrong person can be costly. Consequences can range from the additional expense of recruiting and training another candidate when things don't work out, to the high cost of legal proceedings when the wrong employee becomes a disgruntled employee seeking restitution before a judge.

Evaluate your needs and requirements

One way to avoid choosing the wrong person is to adopt a program of *focused hiring*.

In most interviews, the interviewer focuses on finding the person with the most relevant experience and skills. But in the process, how the candidate matches up with regard to personality, work style, motivation, career goals, and so on, often is overlooked.

In focused hiring, you carefully evaluate the job requirements and determine the characteristics of those who tend to be successful in the type of position you have open. You also must have a thorough understanding of: your winery, its culture, the people within the organization, customers, plans for growth, short- and long-term goals, and its past history.

The most successful work relationships are those in which the person hired is a perfect fit within the winery and alongside other employees. So before scheduling interviews, focus thoroughly on the needs and requirements of the position. Start with these basic guidelines:

- Know the job success factors.
- Know your true requirements.
- Be certain you thoroughly understand the real duties of the job. If necessary, prepare an accurate and up-to-date job description of what the job will be versus what it has been in the past.

Then, to thoroughly understand the type of person who will be the right match for the job and thus will have the best potential for finding success within your winery, ask yourself the following questions:

- Who are the best employees?
- What 10 words would I use to describe them?
- Which employee(s) do I feel most comfortable with, trust the most, and why?
- What special needs does the winery have that may test the new employee's ability and willingness to work overtime on short notice, to travel, to handle difficult clients, and so on?
- What are the strengths of our staff?
- What staff weaknesses would I like to strengthen through this new hire?
- How will this new employee fit in with the rest of the winery staff? Will his responsibilities change over the next two years? If so, what changes are anticipated and what additional abilities may be needed?

A clear understanding

By carefully considering and answering all these questions, you should develop a clear understanding of the technical skills you require. In addition, you should gain insight about the type of person who will apply these skills in a way that leaves both of you feeling good about your work relationship.

Furthermore, by carefully evaluating your needs prior to each recruitment effort, you can select better candidates. Consequently, once hired, they will contribute to productivity and help make your winery a better place to work. Remember, hiring the right person not only makes life easier for you and your employees, it enhances your bottom line as well. ■

(Next: Part II — Sourcing, evaluating resumes and applications, and phone-screening.)

Carolyn Silvestri is founder and owner of The Personnel Perspective, a human resources consulting, recruiting, and executive search firm, tel: 707/576-7653.

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LEAFROLL disease of grapevines

By Ed Weber, Deborah Golino, and Adib Rowhani

Introduction

Leafroll, a virus-like disease of grapevines, is worldwide in distribution. In some viticultural regions, nearly 100% of vines are infected.[16] Despite having been recognized for nearly 150 years, leafroll continues to be a serious problem in all major grape growing areas. Clean stock programs have been established in several countries in order to produce, maintain, and distribute grapevines which are free of leafroll and other diseases.

History

Leafroll likely originated in the Near East along with *Vitis vinifera*.[10] The disease has been spread throughout the world through the movement of infected plants and cuttings. Leafroll does not occur naturally in *Vitis* species native to North America.[10]

Reports of disorders which were likely caused by leafroll occurred as early as 1853 in France, where it was known as *rougeau*, and 1905 in California, where it was called red-leaf.[8] In 1936, it was estimated that 80% of the vines in Germany were infected with leafroll.[19]

Leafroll was first identified in California in 1958 by Goheen *et al.*[7] They showed that leafroll was the cause of poor color development and maturation in the red table grape variety Emperor, a disorder which had previously been called white Emperor disease. Since that time, considerable research has been conducted to explain the cause and effects of grape leafroll disease.

Symptoms and effects of leafroll

Symptoms of leafroll vary with the time of year, the variety of grape, and environmental factors. Symptoms may not be expressed on all infected vines.

Budbreak and shoot development are often delayed in leafroll-infected vines. This is a usually short-lived phenomenon, apparent only for a few weeks.

Leaf symptoms first become apparent in early to mid-summer, often appearing earlier on vines which are water-stressed. These symptoms increase in number and severity until the first frost. Leaves on the basal portion of shoots begin to roll downward at the margins. The interveinal areas change color and may become necrotic. Most rootstock varieties show no foliar symptoms of leafroll.

In most red varieties, leafroll causes a reddening of the interveinal areas while the veins remain green. The veins may or may nor retain their green color in advanced stages of the disease.[16] Leaves of some red varieties, particularly those with deeply pigmented fruit, develop uniform red color without green veins.

In white varieties, the interveinal area may become chlorotic. This symptom is often subtle and may not be recognized.

The extent of leaf-rolling varies considerably among infected varieties. Some, like Chardonnay, show pronounced leaf-rolling by harvest. Others, such as Thompson Seedless and Sauvignon blanc, show little or no leaf-rolling at all.[9] In these white varieties, leafroll is nearly impossible to detect on a visual basis.

As the growing season progresses, more and more leaves display leafroll symptoms, progressing from the base of the shoot to the tip. The bright red leaves that delight autumn tourists are simply an expression of grape leafroll disease.

Leafroll causes a degeneration of primary phloem tissue in young shoots, leaves, and fruit pedicels.[14] Starch accumulates in infected leaves coincident with this phloem disruption.

Leaf symptoms similar to leafroll can be caused by injuries, or other diseases, which disrupt the phloem. Mechanical injury to the trunk, bending or cracking of canes, poor graft unions, and girdling can all damage the phloem and lead to leaf-rolling and coloration similar to that caused by leafroll. Feeding by certain insects and mites, as well as some other disease agents (most notably *Phytophthora*), can cause similar symptoms.[9]

Leafroll reduces overall vine growth and yield. Annual pruning weights, cluster number and cluster size are all reduced in infected vines. The range in crop loss varies considerably, however, a 20% reduction is not uncommon.[10]

Fruit quality from leafroll-infected vines is also adversely affected. Sugar accumulation is delayed and anthocyanin production in red varieties is greatly reduced. The resultant fruit is low in sugar, poorly colored, and often is several weeks delayed in ripening, compared to fruit from healthy vines. In some seasons, fruit on infected vines never reaches desired sugar levels.

Whether there is a reduction in wine quality as a direct result of leafroll, independent of its effect on grape maturity, is unclear. However, delaying harvest by several weeks can be catastrophic if it subjects the fruit to fall rains.

Leafroll and potassium deficiency

Leaf symptoms due to leafroll have often been confused with those of potassium deficiency. As a result, many vineyards have been diagnosed as potassium-deficient, when in fact they were infected with leafroll.

Leafroll infection affects vines such that leaf blades from infected vines are lower in potassium, and other mineral nutrients, than from healthy vines.[3] Applying high doses of potassium can reduce the severity of leaf symptoms, but does not prevent their development. Under conditions where the supply of potassium is limited, leafroll can accentuate potassium deficiency symptoms.

True potassium deficiency can be distinguished from leafroll in that potassium deficiency symptoms tend to appear earlier in the season, and first on leaves in the middle region of the shoot, rather than on basal leaves, as is the case for leafroll.[3]

Causal agents

The viral nature of leafroll was first suggested by G. Scheu in 1936.[19] Early evidence for this was that the disease could readily be transmitted by grafting, and no macroscopic causal agent could be found. Different strains or types of leafroll were recognized, based on differences in the severity of symptoms on infected vines. Early attempts to identify the causal agent of leafroll were unsuccessful.

Proving that a disease is caused by a virus can be difficult. Until certain research results are obtained, the disease is referred to as virus-like, and the virus is said to be associated with the disease. These terms usually suggest that the associated virus can be graft-transmitted, and can be eliminated from diseased vines through heat therapy or by shoot-tip culture.

Recent research has established that several different viruses are associated with leafroll disease.[12,15,21,23] Leafroll, as we know it, likely represents a group of diseases with similar symptoms which are caused by several different viruses, either alone or in combination.

Six serologically distinct closteroviruses associated with leafroll have been described.[12,13,23] Five are referred to as grapevine leafroll-associated viruses (GLRaV types I, II, III, IV, V). The other is known as grapevine virus-A (GVA).[4,17]

In addition, two other types of virus particles have been implicated in leafroll disease: a potyvirus-like particle,[20] and an isometric-like particle.[2]

The actual cause of leafroll disease remains unclear. A vine displaying symptoms of leafroll could be infected with any one of these viruses, or by a combination of more than one. Furthermore, there may be additional viruses associated with leafroll still to be discovered.

Leafroll spread

Leafroll is readily transmitted from infected vines to healthy vines through graft inoculation. Normal viticultural practices of bench-grafting, budding, and varietal conversion provide many opportunities for the introduction of leaf-roll into vineyards. Leafroll spread via pruning shears or saws is highly unlikely; a graft union must be present.

The use of certified, virus-tested grape materials for propagation and establishment of vineyards is the best insurance against introducing leafroll to new vineyards.

Natural spread of leafroll from infected vines to healthy ones growing nearby has been observed in California, but usually at a very low rate of spread.[11] Higher rates of spread have been observed in South Africa and New Zealand. Several mealybug species have been shown experimentally to transmit leafroll.

In South Africa, the vine mealybug, *Planococcus ficus,* is able to transmit GVA and GLRaV type-III from infected vines to healthy ones.[5,6] Work in Israel has shown that *Pseudococcus longispinus*, a mealybug known to occur there, can transmit GLRaV type-III from vine to vine.[21] Another mealybug, *Planococcus citri*, has been shown to transmit GVA to an herbaceous indicator plant.[18]

Recently, evidence of significant spread of leafroll in a California vineyard has renewed interest in identifying a vector for natural spread.

Leafroll detection and diagnostic methods

Visual observation of vines is not a useful method for diagnosis of leafroll. Symptoms of leafroll are highly variable depending on variety, time of year, the strain of leafroll present, and the environment. Some infected vines may show no visual symptoms of leafroll. Physical damage, insects, mites, other diseases, and nutritional disorders can all cause leaf symptoms which mimic those caused by leafroll.

Biological indexing tests can reliably detect the different viruses associated with leafroll. Indexing tests utilize grape selections which are especially sensitive to particular virus diseases. Such 'indicator' varieties have been used in grapevine certification programs for many years.

In an indexing test for leafroll, buds from the grape selection being tested are grafted to potted vines of the indicator variety. The grafted plants are then grown in a field plot for about 18 months. If the tested selection had leafroll dis-ease, the indicator vines will develop red leaves in the fall.

Indexing is considered a very reliable test as the indicator plant amplifies any virus present in the grafted bud. However, recent research suggests that in some cases, leafroll disease may escape detection by indexing tests. Indexing is not a practical diagnostic tool on a commercial basis because of the length of time required for disease expression.

Several indicators have been used to test for leafroll, including Emperor, Mission, Gamay, Cabernet Sauvignon, Pinot noir, Cabernet franc, and Barbera.[1] The sensitivity of these indicator varieties varies under different environmental conditions. At the University of California, Davis, Cabernet franc has proven to be the most reliable indicator for leafroll.

There are rapid tests available for leafroll. The most widely used is a serological test called Enzyme Linked Immunosorbent Assay (ELISA). This is a 2-day laboratory test which relies on antibodies specific to the agent being tested for. ELISA is routinely used in many crops to test for certain viruses, bacteria and fungi. It can also be used to test for pesticides or other contaminants of soil and water.

ELISA testing was recently developed for leafroll, but it is more complicated than for many other diseases. Because the viruses associated with leafroll are serologically distinct, separate antisera must be prepared against each one. In preparing antisera, purified virus samples are required. For some virus diseases, a plant other than grapevine is inoculated and virus is then purified from it. This minimizes interference in ELISA from reaction of the antisera to grape proteins or similar viruses which could be present.

This inoculation technique does not work with leafroll. Therefore, infected grape tissue is used for virus purification. A possibility exists that viruses not involved in leafroll disease co-purify with the grapevine leafroll-associated viruses. The result would be an antisera which reacts to these additional viruses, leading to false-positive test results for leafroll.

To thoroughly ELISA-test a selection for all the viruses currently associated with leafroll, at least eight separate tests would be required, one for each virus. In the U.S., antisera have been purified and are available only for GLRaV types I, II, III, and IV.

ELISA results can be affected by the type of tissue being tested (leaf, petiole, root, etc.) and by the time of year collections are made. Leaf blades and petioles are commonly collected for ELISA testing. Because leafroll agents are phloem-limited, petioles and/or major veins in the blades are used.

Leaves should be collected after bloom. Earlier in the season the virus concentration (titer) in leaves is very low.[22] Basal leaves should be sampled as these will have the highest titer. This differs from other virus diseases, such as fanleaf, in which the highest titer occurs in young leaves near the shoot tip.

Bark scrapings from dormant canes also provide good tissue for leafroll ELISA testing. Dormant cuttings can be collected and refrigerated for later analysis. The ability to utilize stored wood makes ELISA a useful technique for testing propagating materials.

Test results from ELISA must be properly interpreted. A positive ELISA test for leafroll usually indicates that the particular leafroll-associated virus is present in the tested sample. Occasional false-positive and false-negative results occur using ELISA. Research is underway to determine why this happens.

A negative ELISA test does not mean that the selection is free of leafroll — only that the particular virus being tested for was not detected. Leafroll-associated viruses can be present at very low levels which escape detection by ELISA.

Additionally, recent studies indicate that leafroll-associated viruses may not be uniformly distributed within a vine. Tissue collected from one portion of the vine could test negative, while another portion tests positive.

ELISA testing for GLRaV types I-IV is available through commercial laboratories. Results from one laboratory suggest that GLRaV type-III is the most common in California selections (see sidebar).

Other rapid tests are being developed or are in use experimentally for leafroll detection. Again, because more than one virus is involved, applying these new tests to leafroll will be more difficult than for other diseases.

Leafroll at FPMS

Foundation Plant Materials Service (FPMS) at UC-Davis, is a repository for virus-tested, true-to-variety grape selections. FPMS provides cuttings to commercial nurseries participating in the California Grapevine Registration and Certification Program. Certified selections from FPMS have undergone several indexing tests before release to nurseries for propagation.

In 1992, leafroll disease was detected in numerous certified selections at FPMS. These selections had previously tested free of the disease by indexing. The discovery of leafroll came as a result of the first extensive ELISA-testing of FPMS vines. Approximately 5% of the certified mother vines at FPMS were initially tested; about 20% of these tested positive for leafroll. Further testing of FPMS mother vines is underway.

Four FPMS certified mother vines with leafroll-like symptoms tested positive for leafroll in 1991 using ELISA. Leafroll in these vines was confirmed in 1992 by indexing.

It is believed that leafroll spread from diseased to healthy vines which were growing adjacent to each other in the FPMS vineyards. How this happened has not yet been determined.

FPMS, the California Dept. of Food & Agriculture, University of California researchers, and industry members are cooperating in updating the California Certification Program to incorporate new testing methodology, and to minimize the chances of future spread of diseases to certified vines. The status of the infected materials at FPMS, and the implications for participating nurseries, is under review.

Summary

Grapevine leafroll disease is a serious problem which should not be considered lightly. Using certified rootstocks and scions continues to be the best insurance against introducing leafroll, or other damaging diseases, into new vineyards. Further understanding of grapevine leafroll disease, advances in disease testing methodology, and stricter standards in certification programs will all serve to improve the quality of grapevine planting materials. ■

Ed Weber is Napa County Farm Advisor, University of California Cooperative Extension. Deborah Golino is Research Plant Pathologist, USDA-ARS at UC-Davis. Adib Rowhani is Specialist, Dept. of Plant Pathology, UC-Davis.

References

1. Bovey, R., Caudwell, A., Frison, E.A., Golino, D.A., Gonsalves, D., Ikin, R., Kyriakopoulou, T., Martelli G.P., Rezaian, M.A., Rumbos, I., and Walter, B. 1991. FAO\IBPGR

Leafroll ELISA test results

By Glenn Friebertshauser, Agri-Analysis Associates,

Agri-Analysis is a commercial laboratory in Davis, CA which specializes in the use of enzyme-linked immunosorbent assays (ELISA) for the detection of plant disease agents and pesticides in soil and water. Presently, leafroll ELISA tests are available for GLRaV types I, II, III, and IV.

After assaying several thousand samples over the past 18 months, several interesting observations have been made.

Positive tests for leafroll have occurred in 21% of the total samples submitted. Different sets of samples may have widely varying incidences of positive samples, depending upon whether samples are from visually symptomatic plants submitted for confirmation of diagnosis, or are from a random plant nursery survey.

In the samples which were leafroll positive, type-III was the most commonly encountered, followed by types II and I. Type-IV has not been confirmed as occurring in any of the wine grape varieties, although it has been widely found in table grape selections. The percentage breakdown of positive ELISA leafroll tests is shown below.

Breakdown of positive ELISA leafroll tests

Type I	17%
Type II	25%
Type III	31%
Types I, II	5%
Types I, III	1%
Types II, III	2%
Types I, II, III	19%

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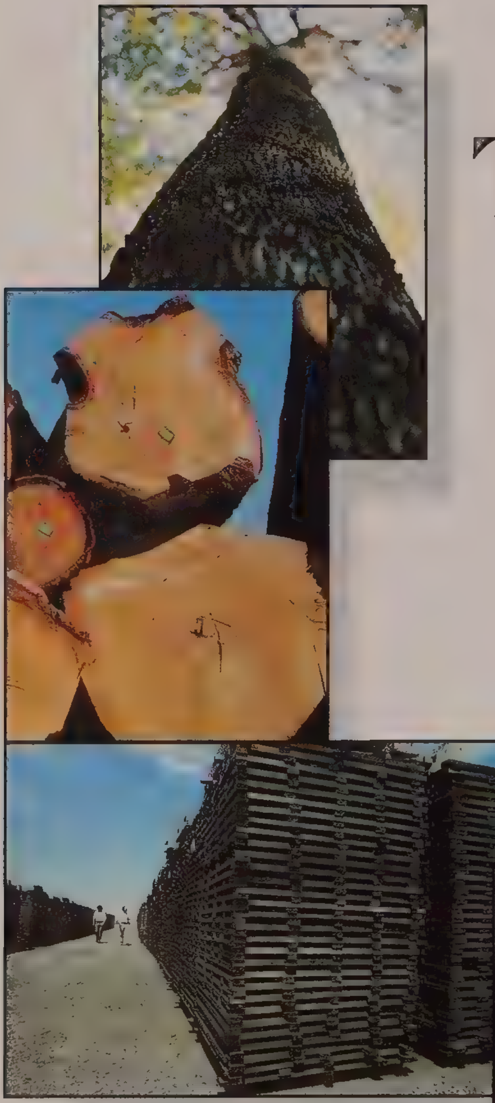

Tonnellerie Seguin Moreau has been producing premium French Oak barrels since 1843. Today the Seguin Moreau barrels are found in the cellars of the most prestigious wineries in the world. Seguin Moreau now manufactures an American Oak barrel.

The wood is a blend of the highest quality, hand-selected white oak from Missouri, Ohio, Wisconsin, Illinois and Iowa. The rough-hewn staves are shipped to France where they are stacked and air-dried for about 24 months. The wood is then coopered in the traditional French method by master coopers of Seguin Moreau. This includes a slow toasting over a natural wood fire to carmelize and soften aromatic components.

The American Oak barrels complement a special style of Chardonnay and red wines such as Shiraz, Cabernet and Zinfandel. The barrels are available in two sizes; the standard Bordeaux Export shape of 225 liters and also in a 300 liter Puncheon size.

The exacting care and dedication that has been a hallmark of Seguin Moreau in the making of premium French Oak barrels continues in the production of the American Oak barrel.

SEGUIN MOREAU, USA

2180 JEFFERSON STREET • SECOND FLOOR • NAPA, CA 94559
TELEPHONE: 707-252-3408 • TELEX: 330153 • FAX: 707-252-0319

Continued from page 23

Technical Guidelines for the safe movement of grapevine germplasm. Eds. E.A. Frison an R. Ikin. Food and Agriculture Organization of the United Nations, Rome, Italy.

2. Castellano, M.A., Martelli, G.P., and Savino, V. 1983. Virus-like particles and ultrastructural modifications in the phloem of leafroll-infected grapevines. ***Vitis*** 22: 23-39.
3. Cook, J.A., and Goheen, A.C. 1961. The effects of a virus disease, leafroll, on the mineral composition of grape tissue and a comparison of leafroll and potassium deficiency symptoms. Amer. Inst. Biol. Sci., publ. no. 8, 338-354.
4. Conti, M., Milne, R.G., Luisoni, E., and Boccardo, G. 1980. A closterovirus from a stem-pitting-diseased grapevine. ***Phytopathology*** 70: 394-399.
5. Engelbrecht, D.J. and Kasdorf, G.G.F. 1990. Transmission of grapevine leafroll disease and associated closteroviruses by the vine mealybug, *Planococcus ficus*. ***Phytolactica*** 22: 341-346.
6. Engelbrecht, D.J. and Kasdorf, G.G.F. 1990. Field spread of corky bark, fleck, leafroll and shiraz decline diseases and associated viruses in South African grapevines. ***Phytolactica*** 22: 347-354.
7. Goheen, A.C., Harmon, F.N., Weinberger, J.H. 1958. Leafroll (white Emperor disease) of grapes in California. ***Phytopathology*** 48: 51-54.
8. Goheen, A.C. and Cook, J.A. 1959. Leafroll (red-leaf or rougeau) and its effects on vine growth, fruit quality and yields. ***Am. J. Enol. Vitic.*** 10: 78-84.
9. Goheen, A.C. and Hewitt, W.B. 1964. Diagnosis of leafroll of grapevines. ***Riv. di path. Veg.*** 4: 427-442.
10. Goheen, A.C. 1988. Diseases caused by viruses and viruslike agents. Pp 47-54 in: Compendium of Grape Diseases. R.C. Pearson and A.C.Goheen, eds. American Phytopathological Society, St. Paul, MN. 93 pp.
11. Goheen, A.C. 1989. Virus diseases and grapevine selection. ***Am. J. Enol. Vitic.*** 40: 67-72.
12. Gugerli, P. 1991. Grapevine closteroviruses. Pp 40-51 in: Proceedings of the 10th meeting of the International council for the study of viruses and virus diseases of the grapevine (ICVG). Edited by I.C. Rumbos, Bovey, R., Gonsalves, D. Hewitt, W.B. and Martelli, G.P. Ores publishing, Volos, Greece.
13. Hewitt, W.B. 1991. Viroses and virus-like diseases of grapevines: an overview of results of research - approaches and accomplishments on cause, nature and control. Pp 21-39 in: Proceedings of the 10th meeting of the International council for the study of viruses and virus diseases of the grapevine (ICVG). Edited by I.C. Rumbos, Bovey, R., Gonsalves, D. Hewitt, W.B. and Martelli, G.P. Ores publishing, Volos, Greece.
14. Hoefert, L.L. and Gifford, E.M. 1967. Grapevine leafroll virus - history and anatomical effects. ***Hilgardia*** 38(11): 403-426.
15. Hu, J.S., Gonsalves, D. and Teliz, D. 1990. Characterization of closterovirus-like particles associated with grapevine leafroll disease. ***J. Phytopathology*** 128: 1-14.
16. Martelli, G.P. Detection and diagnosis of graft-transmissible diseases of grapevine. Food and Agricultural Organization of the United Nations in cooperation with the International Council for the Study of Viruses and Virus diseases of the Grapevine. (In Press, 1992)
17. Milne, R.G., Conti, M., Lesemann, D. E., Stellmach G., Tanne, E., and Cohen, J. 1984. Closterovirus-like particles of two types associated with diseased grapevines. ***Phytopath. Z.*** 110: 360-368.
18. Rosciglione, B. and Castellano, M.A. 1985. Further evidence that mealybugs can transmit grapevine virus A (GVA) to herbaceous hosts. ***Phytopath. medit.*** 24: 186-188.
19. Scheu, G. 1936. Mein Winzerbuch. Reichbnahrstand. Verlas-Ges. m.b.H., Berlin. 274pp.
20. Tanne, E., Sela, I., Klein, M., and Harpaz, I. 1977. Purification and characterization of a virus associated with the grapevine leafroll disease. ***Phytopathology*** 67: 442-447.
21. Tanne, E., Ben-Dov, Y., and Raccah, B. 1989. Transmission of closterovirus-like particles by mealybugs (Pseudococcidea) in Israel. ***Phytoparasitica*** 17: 63-64.
22. Teliz, D., Tanne, E., Gonsalves, D., and Zee, F. 1987. Field serological detection of viral antigens associated with grapevine leafroll disease. ***Plant Disease*** 71: 704-709.
23. Zimmerman, D., Bass, P., Legin, R., and Walter, B. 1990. Characterization and serological detection of four closterovirus-like particles associated with leafroll disease on grapevine. ***J. Phytopathology*** 130: 205-218.

MOON VALLEY CIRCUITS

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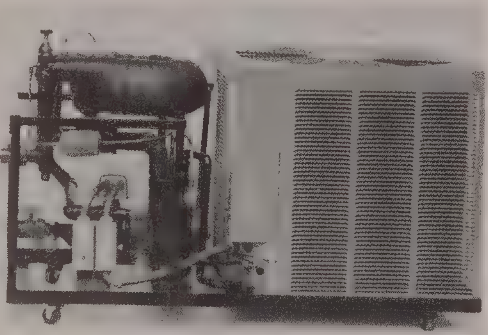
EQUIPMENT FOR Grapes, Juice, Wine

Advanced Aero Vac Tech

Advanced Aero Vac Tech is the manufacturer and supplier of Aguair chillers for the small vineyardist and experimental grape production. These compact chillers range form 1.5 to 5-tons and are available in heat/cool or cool-only models.



Each unit is a complete, portable package with circulating pumps, safety and cycling controls. These units are compact in size, easy to operate and well-designed; consisting of air-cooled refrigeration condensing unit and heat exchanger with all necessary control work.

Aquair chillers can be easily attached to any fermentation tank.

Advanced Aero Vac Tech also offers complete refrigeration service and installation to all Sonoma and Napa county wineries and is a (RSES) Refrigeration Service Engineer Society member. (California State Lic.#515690)

For more information, contact: **Advanced Aero Vac Tech**, PO Box 777, Glen Ellen, CA 95442, tel: 707/996-6565.
Please see our ad, page 10.

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Boswell Company

The most recent Boswell innovation is the 'foot valve,' a stainless steel cylinder designed for the bottom of a racking tube. This device contains a ball to seal off the end of the tube when pumping is stopped.

Use of the foot valve reduces oxygen pick-up by nearly 50%, prevents wine spillage, and eliminates backflowing into the barrel. The foot valve also can help improve wine clarity since different spacer units allow the winemaker to set the racking tube level above the lees/sediment as necessary. Filtration may thus be reduced. Current foot valve models are available only for straight racking tubes, but an angled version for bent tubes will be introduced in 1993.

Boswell also represents the Bulldog's Pup, a stainless steel barrel racking wand that uses gas pressure to move wine. This carefully designed tool allows controlled gentle flow without agitation or oxidation. Versatile and easy to use, the Pup is used for high quality racking or topping. A stainless steel adjustable support stand for the Bulldog's Pup will be available in 1993.

For stirring lees in barrels or chemical additions, the Boswell stainless steel 'dodine' is extremely effective. Hand-operated, the tool has an elliptical blade at the bottom which pivots and conforms to the barrel surface. Stirring and mixing is accomplished with minimal oxygenation. Three rod versions are available with choice based on access and barrel stacking system.

Boswell also supplies hose cleaning balls, imported from Germany. This simple product allows you to mechanically rough clean wine hoses and stainless steel transfer lines. The sponge rubber balls are easily compressed by hand into the lines and then pushed through, using normal water pressure. The result is better sanitation and potentially less chemical consumption.

For more information, contact: **Boswell Company**, 1000 Fourth St.#360, San Rafael, CA 94901, tel: 415/457-3955, fax: 415/457-0304.
Please see our ad, page 53.

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Carlsen & Associates

Carlsen & Associates is a design and manufacturing company specializing in process equipment for the wine industry with a primary product line of pumps and pump systems.

Without a doubt, the most versatile of these products is a portable, positive displacement pump. Utilizing a Waukesha pump head coupled to a gear motor, with a variable speed AC-frequency controller, we have developed a system that will pump must (up to 55 tons/hr), pump red pomace, do rackings, transfers, pump-overs, filtrations, and pump the wine to the filler for bottling. This is truly the one pump that will do everything in a winery. The days are gone, when a winery has to purchase specific pumps for each process.

Another important development in pumping for winemaking, is use of the double diaphragm air pump. With winemakers moving more and more to barrel fermentation and ageing, the need for simple, gentle pumps, to both fill and empty barrels, has become extremely important.

The double diaphragm air pump, complete with a surge suppressor, is the ideal pump for this work. The pump is also capable of pumping to pressures in excess of 100-psi, hence, is also well-suited for filtering. Theis pump is also being used for lees filtering, with the installation of a doubling kit that will produce twice the amount of product pressure to air inlet pressure.

We are constantly reviewing our existing products for improvements, and developing new lines to help improve winemaking techniques.

For more information, contact: **Carlsen & Associates**, 5228 Aero Dr., Santa Rosa, CA 95403, tel: 707/576-0632, fax: 707/576-7698.

Please see our ad, page 37.

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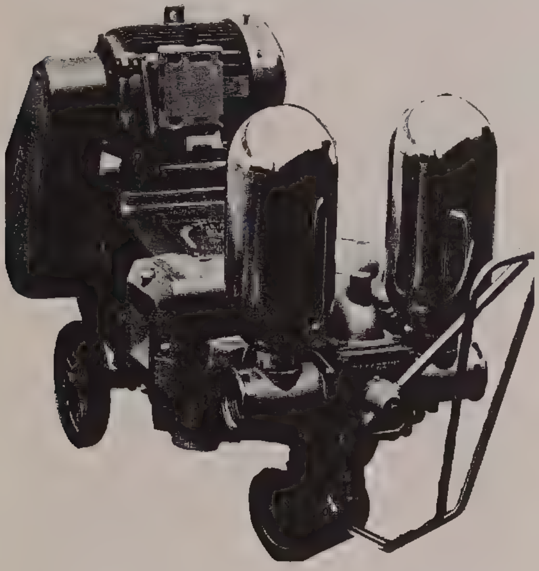
The Compleat Winemaker (TCW)

TCW supplies a wide variety of processing equipment to the wine industry, including many different pumps for all winery pumping needs. Available are: TCW-designed transfer pumps with Jabsco heads to 100-gpm or Zambelli heads to 125-gpm; Nicolini and Ragazzini piston pumps; Egretier elliptical-piston auger-fed pumps; and Ragazzini Rotho peristaltic (tubing) pumps. Other pumps include TriClover centrifugal and rotary lobe pumps; Aro, Sandpiper, and Wilden air-diaphragm pumps; Madden metering pumps; and Aro and Grover air-piston pumps.



Crushing and pressing equipment for small to medium-sized wineries include Zambelli destemmer/crushers to 6-tons/hr; hydraulic basket presses; and the Zambelli electric, hydraulic basket press with two baskets — allowing one basket to be filled while the other is pressing.

TCW represents Schenk Filter Systems of Germany, who make lees filters, sheet filters, and portable pressure-leaf filters in various sizes.

Control boxes for membrane presses are constructed from domestic components. The flexible program allows for proper pressing of any grape variety. Units are individually programmed and can be adapted to many types of presses.

Supplies for wineries include: TriClamp and I-line stainless steel fittings, custom stainless steel fittings, Flo-Coupling fittings, winery hose, butterfly valves, ball valves, pressure-vacuum relief vents, and sample valves.

The Compleat Winemaker is located in a new building and adjacent shop at 955 Vintage Ave., St. Helena, CA. Contact: Bob or Flint Ellsworth, tel: 707/963-9681, fax: 707/963-7739

Please see our ad, page 18.

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Criveller Company

Criveller Company has supplied equipment for wine bottling (especially in the small to medium-size wineries) since 1979. Pressure fillers, capping machines, or monoblocs are available.

A very small and compact pressure-filling monobloc with 12 spouts plus one capping head can be supplied with pre-evacuation to reduce the oxygen content in the bottled product.

This unit, specifically designed for the small/medium winery, can be supplied with a self-powered bottle conveyor track or it can be inserted in an existing bottling line.

Standard labeling equipment or self-adhesive labellers are available along with the semi-automatic line of equipment, offering many choices to wineries .

For information and references, contact: **Criveller Company,** 6935 Oakwood Dr., Niagara Falls, Ont. L2E6S5 tel: 416/357-2930, fax: 416/374-2930.

Please see our ad on page 18.

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Definox Division, Defontaine, Inc.

Definox Division, Defontaine, Inc. is a French manufacturer of high quality Definox sanitary butterfly valves, check valves, and air-operated valves. They also manufacture tank pressure relief valves, metric fittings, diaphragm valves, and double block and bleed valves.

For more information, contact: **Definox** at tel: 414/797-5730, fax: 414/797-5735 for help with your sanitary needs.

❖

Euro-Machines, Inc.

Euro-Machines, Inc. (a subsidiary of Scharfenberger Company of Germany, manufacturer of the Europress) offers a new line of vineyard hedgers/trimmers made by Leckron. There are two tractor front-mounted models available.

The VR-model has one side cutter bar with six rotating knives and one topping bar with two knives. The VR-U model is the most popular unit, so far, because it has two side cutter bars with one topping bar and allows completion of a row with one tractor-pass. One side cutter bar can be removed in order to use the VR-U model as a VR (L-shaped) unit.

The knives are belt-driven and both models come with hydraulic width and height adjustment and mechanical side slope adjustment. All necessary hydraulic controls, hoses, and fittings are delivered with the unit.

Photo courtesy of Wine East

The side cutter bars are 6-feet, 3-inches high and the topping bar is 1-foot, 6-inches wide. The VR model weight is 330-lbs and the VR-U weighs 440-lbs.

Euro-Machines also offers turn-key operations for any size winery: the Europress, a stainless steel grape press from 1,800-L to 25,000-L capacity; the Braud self-propelled grape harvester, model-2720, which can be used year-round for tasks such as spraying and hedging, etc., since the harvesting head can be easily removed; the Braud harvester, model-524 is tractor-pulled; stainless steel grape gondolas with built-in auger and must pump driven by pto; destemmer/crushers; must, juice, and wine pumps, and more.

For complete information, contact: **Euro-Machines, Inc.**, PO Box 843, Culpeper, VA 22701, tel: 703/825-5700, fax: 703/825-5789.

Please see our ad, pages 38,40.

For further information on the WEST COAST for specific equipment needs, contact one of the following:

Europress: Process Engineers, Inc.,

3329 Baumberg Ave., Hayward, CA 94545, tel: 510/782-5122, fax: 510/785-8187.

Braud harvesters: H&G Equipment Co., 8155 Gravenstein Hwy, Cotati, CA 94931, tel: 707/795-5113, fax: 707/795-3826.

Santa Maria Tractor, 1039 W.Main St., Santa Maria, CA 93454, tal: 805/928-1771, fax: 805/349-9612.

Anderson Equipment, 647 E.Main St., Grandview, WA 98930, tel: 509/882-3634, fax: 509/882-5789.

Expo Instruments, Inc.

The model #5303, from Expo Instruments, Inc., designed for single tanks or small tank farms, is a simplified version of their multitank, centralized liquid level monitor. The 5303 uses totally new, state-of-the-art circuitry, and is the answer to virtually any application requiring the measuring of liquid levels, from a single tank to any number of tanks.

Model #5303 offers these features: low cost, individual tank system, accurate, easy to install, solid state control (no relays), reliable, simple, and weather-resistant.

Since this is an individual tank system, wiring and installation are greatly simplified, reducing the cost per tank.

The system consists of a probe, probe head, control unit, and cable to connect the probe head to the control unit.

The control unit includes a digital readout, solid state switch for either control or alarm, weather-proof function switches, and calibration controls.

The principle of operation is capacitance, thus a continuous readout, with an accuracy of better than 0.1-inch, is possible with a variety of liquids.

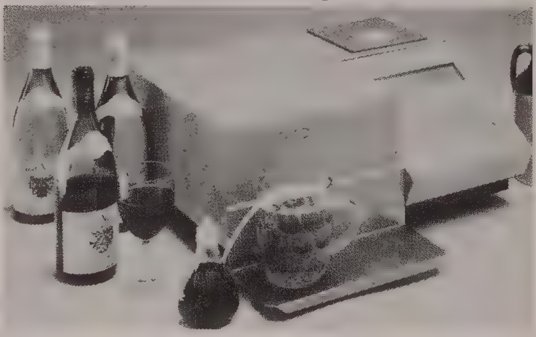
Many options are available, such as expanded tank, height, temperature measurement, and a variety of control configurations.

For more information, contact: **Expo Instruments, Inc.**, 989 E.California St.#4, Sunnyvale, CA 94086, tel: 408/245-8822.

Foss Food Technology Corp.

The Oxford QNV is the first near infrared spectrophotometer specifically designed for the analysis of liquids. It uses a unique transmission cell temperature-stabilized by electrical heaters and Peltier-effect coolers, so efficient, that external water circulation is not required.

A total of 96 different results can be stored, with a maximum of eight calibrations. Programs are provided for printing, copying, and editing existing calibrations and for entering new ones.



The instrument is operated via a keyboard. Results are displayed on a large high-contrast liquid crystal display and printed by a built-in dot matrix printer.

Analysis is carried out by lowering the sampling tube into the sample and pressing the Analyze key. Sample is pumped into the instrument and analyzed automatically. The sample cell pump and all the pipework are easily accessible and removable for cleaning.

Results are stored in memory and may be passed to an external computer via a RS232 communications port. Stored results can be displayed, printed, or used for analyses. The stored results can also be used in the SKEW/BIAS routine for adjusting calibrations. Access to higher level functions and to the calibration routines can be restricted to key personnel.

Foss Food Technology ***also*** offers real-time sanitation monitoring systems by Biotrace. The simple-to-use systems deliver consistent, reliable results in three stages by utilizing quality-controlled reagents, controlled cooling of the optical detector, and a multi-volume electronic digital pipette.

For more information, contact: **Foss Food Technology Corp.**, 10355 W.70th St., Eden Prairie, MN 55344, tel: 612/941-8870, fax: 612/941-6533.

fp Packaging

Two new AR-series presses are available from Diemme in 1993: the 5,000L AR50 and the 8,000L AR80 to replace the AR45 and AR70. In addition to increased capacity, these new presses feature several improvements and options not previously available.

Both the AR50 and AR80 are made entirely of A.I.S.I. 304 stainless steel including all juice contact parts, frames, and all electrical and pneumatic cabinets.

In 1993, all Diemme AR-series presses come with the industry's most comprehensive PLC-control system, featuring a new LCD (liquid crystal display) screen which displays the press status in real time and allows for simple insertion or adjustment of pressing parameters from a touch-key pad.

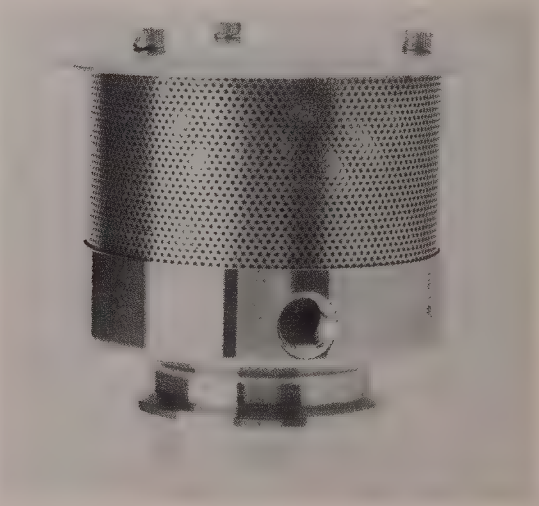
New Diemme options available with the AR50 and AR80 are a semi-automatic washing system which uses high-pressure water to clean behind the juice channels while they remain mounted in the press tank, a pneumatic three-way valve controlled by the PLC for automatically fractionating juice according to pressure, and high efficiency rotary vane air supply systems sized according to the requirements of each press.

Diemme's unique "Intelligent Program" is offered on the AR50 and AR70, and the larger AR130 and AR260 presses. This feedback-based system uses analogue-flow data to continuously adjust pressing parameters based upon pressing requirements of each load of grapes. The "Intelligent Program" thereby simulates an ever-vigilent "ideal operator" by constantly maximizing both juice quality and press cycle efficiency.

For information on how Diemme's AR-series presses can benefit your winery, please contact: **fp Packaging, Inc.**, 385 Oyster Point#3, S.San Francisco, CA 94083-0881, tel: 415/742-5400.

Key Industrial

Key Industrial has introduced an all stainless steel pressure and vacuum relief valve for tank venting. The unit is manufactured by Shae Industries of Healdsburg, CA and is available with tri-clamp type connections in the following diameters: 2-inch, 2.5-inch, 3-inch, and 4-inch. Options are available on request.



The vacuum break is 2-inch W.C. (0.083 PSI) and the pressure break is 22-inch W.C. (0.9 PSI). The vent has an air/bug screen around the entire pressure and vacuum flow area to prevent debris from entering the tank.

The vent can be used with an inert gas system with a ¼-inch FNPT gas inlet in the side of the main body, or the inlet comes with a pipe plug so the vent can be used as a standard tank vent.

Both pressure and vacuum disks are 'O' ring sealed to prevent leakage while holding gas head pressures. For inert gas systems, complete instructions are available from Key Industrial with suggestions for proper regulator selection.

For further information, contact: **Key Industrial,** 997 Enterprise Way, Napa, CA 94558, tel: 707/252-0312, fax: 707/252-9054.

Please see our ad, page 18.

KLR Machines, Inc.

KLR now offers the new Bucher RPA grape press introduced in Europe in 1991, in addition to the new Bucher RPZ dynamically-controlled grape press and Delta DeStemmer introduced in the United States in 1992.

The PLC-controlled Bucher RPA press permits complete control over the pressing range, in addition to the standard Bucher-patented features: 'A'-shaped juice draining elements, spiral pomace discharge elements ***behind*** the membrane, non-perforating membrane attachment bars, and 3-D juice elements. Both minimum and maximum membrane inflation pressure may be infinitely adjusted from 0.02 to 2.00 bar. Up to four user-defined programs may be stored for future use.

The Bucher RPA grape press features a unique photoelectric safety interlock. Axial infeed inlet, timers and valve, as well as a 'built-in' air accelerator, are standard features of the Bucher RPA grape press. The RPA has many of the same features found on the more sophisticated Bucher RPZ press, but was designed for those applications where dynamic pressing and other advanced membrane tank press features are not required.

For more information, contact: **KLR Machines, Inc.**, 350 Morris St.#E, Sebastopol, CA 95472, tel: 707/823-2883, fax: 707/823-6954 OR 47 W.Steuben St., Bath, NY 14810, tel: 607/776-4193, fax: 604/776-9044.

Please see our ad, page 16.

LMH Inc.

LMH Inc. is a distributor of process equipment for the wine industry, specializing in pumps, screeners, and mixers.

Eight years ago, we successfully tested and introduced the gentle handling, highly efficient WEMCO Hidrostal must pump, manufactured in Sacramento, CA. The unique screw/centrifugal, open impeller design gives up to 75% less shear, enabling wineries to increase free run, reduce solids, and increase overall yield. Whether the pump is used for wine transfer, filtration, or on red or white must, the WEMCO Hidrostal accomplished the task with great success.

LMH Inc. offers other important versatile equipment for your process needs, such as the Liquatex screener for waste water clean-up or diatomaceous earth (DE) removal, the Ross high shear mixer for in-line batch mixing of DE or bentonite, the Yamada double diaphragm pump for wine transfer or filtration, APV sanitary centrifugal pumps, APV rotary lobe positive displacement pumps, and the unique low shear non-pulsating Sine pump.

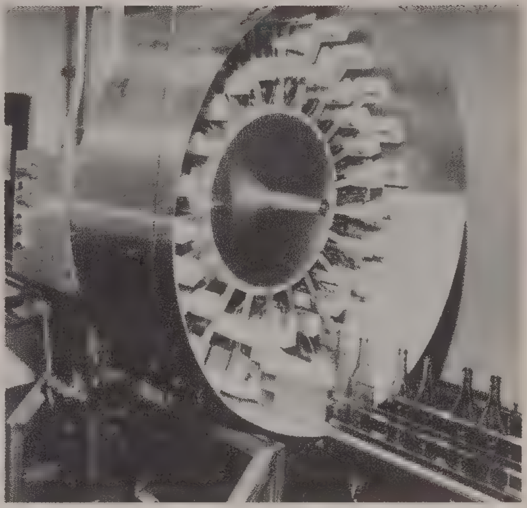
LMH Inc. is dedicated to serving the wine industry, offering technical assistance as well as parts and pumps on the shelf. If you need a pump, screener, or mixer in a hurry, we stand by to assist you with either a new system or rental.

For more information, contact: **LMH Inc.**, 115 Mason Circle, Unit-E, Concord, CA 94520, tel: 510/686-6400, fax: 510/686-3836.

Please see our ad, page 52.

McBrady Engineering, Inc.

Two new additions to our full line of Orbit bottle cleaner, rinsers, and gas injectors are the Model #220 with speeds up to 250bpm and the economy model #40 with speeds of 40 to 50bpm. Each of the cleaner/gas injectors are described below:



Model #220 — features a duplex rotor design that handles two bottles per rotor pocket for twice the cleaning and gas injection time. Speeds up to 250bpm.

Model #200 — standard model, speeds 150bpm.

Model #100 — standard model, speeds 90 to 100bpm.

Model #60 — economy model, speeds 70-80 bpm.

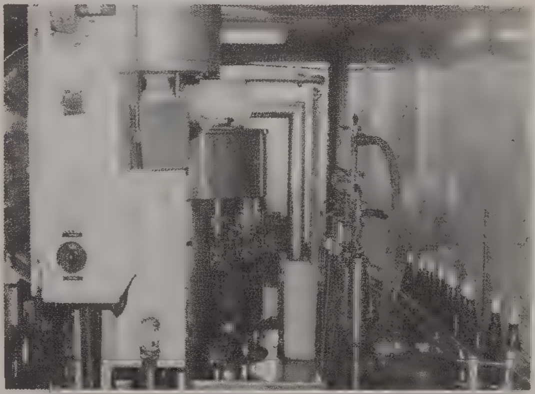
Model #40 — new design, substantially lower cost, speeds 40 to 50bpm.

For more information, contact: **McBrady Engineering, Inc.**, PO Box 2549, Joliet, IL 60436, tel: 815/744-8900, fax: 815/744-8901.

Please see ad, page 51.

Mobile Wine Line

The Mobile Wine Line, operating since 1979, was the first portable bottling service in California. Working with wineries producing 800 to 25,000 cases/year, the equipment is in a self-contained 40-ft. long tractor-trailer. It operates on 220 3-phase or 440-volt power, and can generate electricity, if needed.



The equipment is of dependable German and American manufacture, and consists of: custom loading table;

McBrady Orbit bottle sparger; Seitz Fulla 12-spout vacuum filler/corker; Otto Sick automatic polylaminate/tin foil spinner; Afseal heat shrink tunnel; Mustang-II New Jersey Machine labeler; Labelaire pressure-sensitive back labeler; secondary label press; 3M scotch tape case sealer/printer.

A consulting enologist is available, and the sterility of the wine is guaranteed.

With the winery only needing to provide a crew of six, minimal downtime, and cost-efficient pricing, the winery can now crush, ferment, age, and bottle their wine on the same property, allowing them to call their wine 'estate bottled.'

For more information, contact: **Mobile Wine Line**, 9601 Robson Rd., Galt, CA 95632, tel: 209/745-2871.

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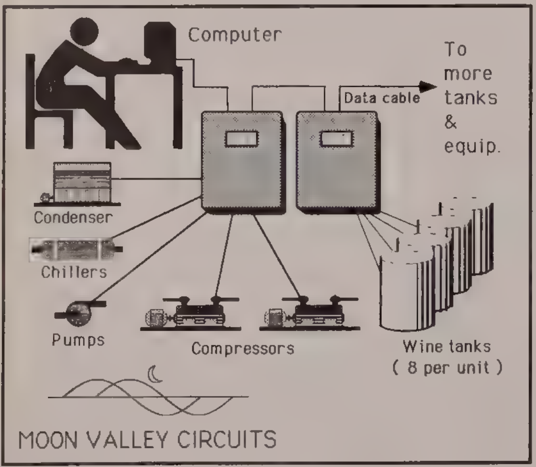
MOON VALLEY CIRCUITS

The MV-1000 Winery Control System is a central monitoring and control system for tanks, refrigeration, and other equipment available from Moon Valley Circuits.

A desktop computer and a network of rugged remote controllers combine to provide an easy-to-use, precise, and very reliable control system. Computer screens display temperatures, pressures, and other parameters throughout the winery.



Settings for the remote units are adjusted using a 'mouse' pointer, eliminating most keyboarding. Detailed graphics eliminate confusion. History graphs help track trends and troubleshoot problems fast. Everything can also be done remotely by phone.

The modular design of the system maximizes reliability and minimizes installation cost, while permitting easy expansion. The MV-1000 remote controllers (RPUs) are designed to handle power outages and failure of the computer without compromising control. The computer may routinely be used for other duties.

Tank temperature is controlled to within 0.1°C (typical), using proportional control (PID). Flexible alarms warn of problems. The MV-1000 can even warn of coolant loss at an individual tank ***before*** that tank drifts off temperature. Control of the refrigeration equipment provides energy savings, early warning of impending problems, and easier troubleshooting.

For more information, contact: **Moon Valley Circuits**, 12350 Maple Glen Rd., Glen Ellen, CA 95442, tel: 707/996-4157.
Please see our ad, page 25.

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PROCESS ENGINEERS, INC.

Process Engineers is the west coast representative for many equipment manufacturers. The newest of which is Gasquet, manufacturer of the Gasquet/Bordeaux barrel washer and a complete line of filtering equipment, and a new line of stainless steel butterfly and ball valves, that set the standard for quality valves at the most reasonable prices in the industry.

We also carry the complete line of well-known Demoisy equipment with everything from stemmer/crushers to grape conveyors and receiving hoppers.

In addition, we are the west coast representative for the Europress. This was the press on the cover of the Nov/Dec'92-***PWV***. Ideal for whole-cluster pressing, due to the unrestricted full capacity drum, infinitely variable program for gentle pressing, and the largest door opening on the market. The press comes with a four-inch axial infeed and ball valve as standard equipment.

With many options available such as five- or six-inch axial inlet, pressure sensor and pneumatic pinch valve, pomace augers, and a Champagne program controller, it's easy to see that the Europress is designed to fit any need. The Europress is available in sizes from 1,800L to 25,000L.

For further information, contact: **Process Engineers Inc.**, 3329 Baumberg Ave., Hayward, CA 94545, tel: 510/782-5122, fax: 510/785-8187.
Please see our ad, page 47.

26569 Corporate Ave.

PROSPERO'S EQUIPMENT CORP. ASSOCIATED WINERY SYSTEMS

The hallmark of the Prospero line of grape processing equipment is the stylistic control available to the creative winemaker. New in 1993, are the Milani rotary fermenters for red wine production. Rotary fermenters offer increased extraction and better cap management.

Milani rotary fermenters have programmable rotation control and the control box can be detached for off-season storage. This all stainless steel fermenter has a cooling/heating jacket, three CO_2 release valves for safety, and variable-speed rotation drive.

The Cingano line of crushers are true multi-mode machines that feature variable-speed destemming drums with destemming bypass. The crusher section has a very simple bypassing arrangement. In case of debris jamming the crusher, safety clutches release the rollers and shut-off the drive motors to prevent damage.

The Defranceschi line of presses has been increased this year with a new 20-hectoliter press for small producers and a new 80-hectoliter mid-sized press. Defranceschi membrane presses are famous for their ease of programming and clean-up after operation.

Prospero's also has a full line of equipment for juice and wine filtration, pumping, and packaging. This includes must pumps by Omac, Strazzari, and Liverani. Vacuum, pressure-leaf, pad, and lees filters by Della Toffola. The world famous GAI filling machines are now available up to 6,000BPH.

For more information, contact: **P.E.C.**, 914 Marble Ave., NY 10570, tel: 800/332-2219 OR **A.W.S.**, 7714 Bell Rd., Windsor, CA 95492, tel: 800/228-0664.

❖

RLS EQUIPMENT CO.

The new Amos Adjustable Drive System (ADS) stemmer/crusher offers extremely gentle action, high whole berry counts, plus many new features that add to the adjustability and adaptability of the machine.

The ADS has an independent variable speed motor on both the basket and internal stainless steel spike stripping mixing bar. The gap between the crushing rollers is adjustable from 3mm to 100mm. In addition, free run from the infeed can be removed separately. The ADS can be used for destemming and/or crushing. Models range in size from

10 to 120 tons/hr.

Amos and Kiesel progressive cavity pumps are available in sizes ranging from 5 to 100 TPH. All models are equipped with reversal protection switches, dry-run protection, and are ideal for transferring must, fermented must, and whole clusters.

Kiesel also manufactures centrifugal and impeller pumps, mixers, and heat exchangers. Centrifugal and impeller pumps are ideal for the transfer of juice, and are available in many sizes. Mixers are available with various noses, and are competitively priced. Heat exchangers, tube-in-shell design, are stainless steel and offer excellent efficiency due to their unique design.

Pressing means Willmes, and both the Tank Press and Universal Press provide high yields and low solids in the juice. Both models come with a variety of options and sizes. PC controllers with champagne or still wine programs are available. Willmes has recently introduced the WCP press, designed specifically for use in the small to mid-size winery. (Exclusive Willmes agent east of the Mississippi River in U.S.A.)

COQ membrane presses are available in sizes from 3,300L to 24,000L. All are constructed of stainless steel, have one or two doors, axial feed, and PC-controllers. Smaller units include a built-in air compressor. Larger presses can be equipped with a variety of options to customize the press for your needs and requirements.

For more information, contact: **RLS Equipment Co.**, tel: 609/965-0074 or 800/527-0197 on the West Coast.
Please see our ad, page 25.

SANTA ROSA STAINLESS STEEL

Santa Rosa Stainless Steel (SRSS) has built and installed over 10,000 tanks in over 500 wineries in the last 23 years.

SRSS manufactures a variety of tanks including: fermenting, storage, and dejuicing tanks. Also dosage and charmat tanks for champagne. SRSS size capacity of tanks ranges from 1-gallon to 230,000 gallons. Cooling jackets of channel design or low or high-pressure jackets for glycol, ammonia, or freon, are available.

SRSS recently designed, fabricated, and installed a 50-bbl brewhouse and fermenting cellar at the Humboldt Brewery in Arcata, CA. The brewhouse included a steam-fired kettle, mashtun, and lautering system.

SRSS maintains a supply of 500, 600, 3,000, and 4,500-gallon stock tanks for immediate delivery.

SRSS also manufactures aluminum catwalks, sumps, press pans, and many other items in stainless steel.

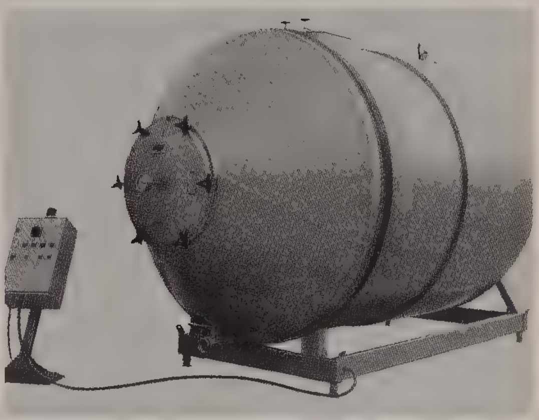
For deliveries outside of the United States, SRSS recently sent eight tanks to Mexico and six tanks to Argentina.

SRSS continues to manufacture quality stainless steel tanks for the wine industry at competitive prices. For further information, contact: Rod Ferronato, at tel: 707/544-7777.
Please see our ad, page 36.

SCOTT LABORATORIES, INC.

Scott Laboratories offers a wide variety of machines for harvest needs. These include stemmer/crushers and pumps from Rauch, presses from Willmes, and rotary fermenters and filters from Velo.

Rauch stemmer/crushers come in 8, 12, and 20 metric ton sizes. All metal contact parts are stainless steel and the many features include varispeed drive and adjustable rollers. Units may be provided with or without progressive cavity pumps.



Willmes presses are offered in three distinct series. The classic TP series is now equipped with PLC controls which may be integrated to user PC systems. PLC controls are also now available as an option of the UP series. The new Willmes CP series was introduced in 1992 with great success in Europe. This new series is specifically designed for smaller wineries and incorporates a unique and patented membrane system which is circumferential to the drum. (Exclusive Willmes agent west of the Mississippi River in U.S.A.)

Velo filtration and rotary fermentation machinery have been seen in America for many years. They are subject to ongoing refinement and remain 'State-of-the-Art.'

For more information, contact: **Scott Laboratories, Inc.,** 2220 Pine View Way, Petaluma, CA 94955, tel: 707/765-6666, fax: 707/765-6674.
Please see ad, pages 6, 45.

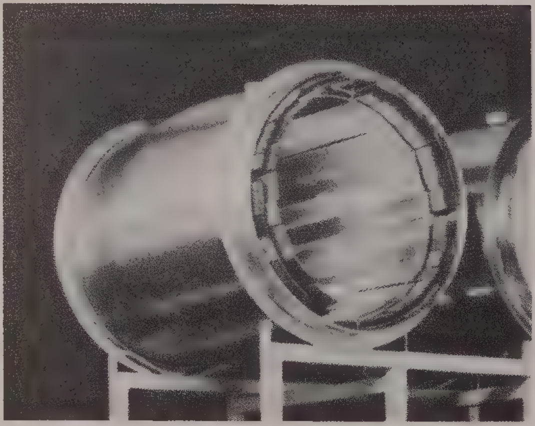
STAVIN, INC.

The StaVin barrel is a patented, stainless steel wine barrel combining the traditional features of a Bordeaux export-style barrel with the technological advances made possible through expert manufacturing and engineering: 225-liters, 14-gauge, 304 stainless steel polished to a B-4 finish (dairy grade).

The StaVin barrel is the only stainless steel barrel in the world with a bilge, allowing for complete evacuation of oxygen and an area for the lees to settle.

Design of the StaVin barrel fits standard barrel racks and it is engineered to stack six pallets high. Loss experienced due to ullage is non-existent in the StaVin barrel. In addition, the winemaker has strict control over oxidation levels.

The barrel has a removable head with a fastened ¼-inch, half-round pharmaceutical-grade silicon gasket, which allows for easy access and cleaning. No soak-up is required, therefore greatly re-



ducing water consumption. Staves are held in place by circumferentail stave-holding units welded into four quadrants, with an area at the bottom of the barrel left open to accomodate a stir rod for surlee programs.

StaVin offers center-of-France, Vosges, Hungarian, and American oak staves which are seasoned, and fire-toasted by hand, strictly adhering to traditional methods. These staves, available in vacuum-packed quantities of 22 sq.ft and 10 sq.ft., provide versatility in controlling the wine-to-wood ratio and in blending different types and toast levels of oak. Using only 10% of the oak wood used in a traditional barrel, StaVin offers winemakers the easiest approach at truly handcrafting their wines.

For more information, contact: **StaVin, Inc.,** 10 Lincoln Dr., Sausalito, CA 94965, tel: 415/331-7849, fax: 415/331-0516.

Valley Pipe & Supply, Inc.

Valley Pipe & Supply, Inc. is the exclusive North American distributor of a full line of Marzola winery equipment. After one year in use at Golden State Vintners in Fresno, CA, the S-250 Servopress (water-bladder tank press), has proven a great success in its pressing process and energy savings.

For more information, contact: **Valley Pipe & Supply,Inc.**, tel: 209/233-0321.

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For example, WESTEC can provide a grape sorting table and incline conveyor. Wine is a delicate mixture of subtle flavors, and to produce a truly great wine, only the best grapes must be used. The sorting table and incline conveyor are the newest in an innovative line of products. The sorting table allows you to inspect your entire crop, not just the surface layer of grapes. The incline conveyor, unlike screw conveyors, causes NO maceration to the grapes; so you can produce truly great wines all the time.

With attention to quality and craftsmanship, as well as dedication to customer support, WESTEC has become a forerunner by providing wineries with the products and services they can depend on.

Other products and services available from WESTEC include: pump-over devices, transfer lines and installation, catwalks and installation, sumps, hoppers, barrel washers, structural steel fabrication and installation, press installation, valves and fittings, etc.

Take advantage of WESTEC experience and qualtiy products. Call WESTEC with your winery's needs. Settle only for the best! Call WESTEC: 707/433-8829.

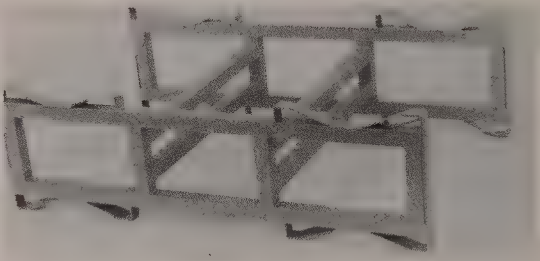
Please see our ad, page 11.

Western Square Industries, Inc.

Western Square Industries, Inc. is the largest supplier of portable (forkliftable) steel barrel racks to the wine industry. Principal models include racks for two barrels or four barrels, both a high-profile model (sometimes called a topping rack), and a new low-profile model which is also a topping rack, inasmuch as the wine can also be worked in place.

Standard models will accommodate all 200L and 225L barrels, but special models are also available. Regardless of what racks are being used by any given winery, we can supply racks that will co-stack.

A new item is a rack for the bottom tier of barrels which can be pallet-jacked from all four directions.



Western Square also makes a barrel washing system which is specifically for use with portable racks.

For those wineries stacking barrels in pyramids, Western Square makes a cradle which replaces four chock blocks and thereby facilitates stacking.

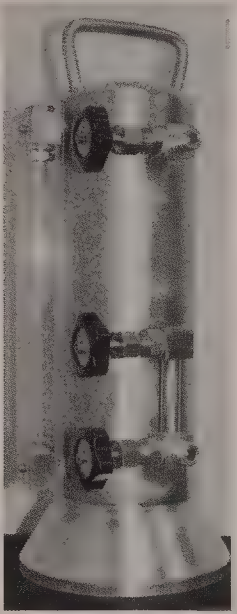
For vineyard operations, Western Square manufactures an improved model of the 2-ton harvest bin used in the 'Valley System' of grape harvesting. Trailers for this system are also offered.

For more information, contact: **Western Square Industries, Inc.**, 1621 N. Broadway, Stockton, CA 95205, tel: 209/944-0921.

Please see our ad, page 39.

Wine Country Gases

Our company supplys a wide variety of cylinder gases to the industry which includes products for winery application, bottling, laboratory, and facility maintenance. In addition, we offer a full spectrum of equipment to aid in the efficient use of these gas products.



The cylinder gas which generates the most activity, including inquiries, questions, and suggestions is, without a doubt — sulfur dioxide. We offer equipment for gaseous application of SO_2 in barrel preservation, gear for making SO_2 aqueous solutions, calibrated dispensers for making 100% pure SO_2 additions to wine, and metered systems for SO_2 additions at the press or crusher.

For more information, contact: **Wine Country Gases**, 3220 Santa Rosa Ave., Santa Rosa, CA 95407, tel: 707/575-8654, OR **Complete Welders Supply**, 101 Camino Dorado, Napa, CA 94558, tel: 707/258-0885.

Please see our ad, page 49.

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HUGHSON, CALIFORNIA

Two New York restaurants succeed with only NY wines

By Thomas Pellechia

To succeed in New York today, a restaurant must offer popular entrees and wine-friendly prices. But is that enough?

Two New York restaurants, Turback's and Mansion Hill Inn, are savoring success, with help from their unusual wine-selling strategy. They sell wine limited to producers in the four regions of New York state.

Turback's

The success of Turback's continues, despite a fire that swept through the Victorian gingerbread-style house in 1987, causing extensive damage that took nine months to repair. Now the building, located just south of Ithaca, NY, in the heart of the Finger Lakes wine region, looks almost like the original.

"The fire was traumatic," owner Michael Turback says. "I even considered giving it all up. But it's behind me. Interest in New York wine continues to grow, and we sell plenty of it."

Turback's has storage space for 25,000 bottles of New York wine. "The fire destroyed a vast amount of 20- to 25-year-old wines," Turback recalls, "made by pioneers like Konstantin Frank, when he started Vinifera Wine Cellars, and Hermann Wiemer, when he was with Bully Hill Vineyards."

Turback's wine list, which changes every six weeks, includes 103 entries ranging in price from $7/bottle to $30/bottle. Of the 65 whites, 46 are vinifera (including 28 Chardonnays, one Sauvignon Blanc, and one Rkatziteli), 18 are French hybrids, and one is a labrusca. The 28 reds are mostly vinifera (11 Pinot Noirs, six Cabernet Sauvignons, and seven Merlots), plus four French hybrids. The list also includes six 'méthode champenoise' and four blush wines.

Turback watches for trends. "Whites still dominate our list but there's a trend today away from French hybrid reds, toward vinifera. We have some from the Finger Lakes and Hudson Valley, but people now look to Long Island for reds.

Photo by Robert Scharf

"We carry many more Chardonnays today, in response to another trend." Fifteen Chardonnays are from the Finger Lakes, and three from the Lake Erie region.

But Turback is "...very disappointed in the public's lack of interest in Riesling. Finger Lakes Rieslings are among the best in the world. In 1985, I thought Riesling was poised to become the next growth product. It didn't happen." Of the 14 Rieslings on the list, 13 are from the Finger Lakes.

Turback's has 90 seats for dinner only, serving about 40 daily and 180 on weekend nights, in winter. The traffic nearly doubles during summer and fall.

The restaurant's success with wine is due, in part, to a trained staff. At monthly tastings, the wait-staff helps select new wines for the changing list.

"If the wait-staff likes the wines," Turback says, "their commitment generates more wine sales. The staff is taught to present wine as if it were a menu item, recommending a wine to suit the dinner order. Daily entree specials include descriptions of suggested wines. Unopened bottles of featured wines are part of the table setting. It helps too that we have a reputation for the best of New York wines. Nearly everyone who eats here orders wine with dinner."

Turback eschews what he calls 'palate-dulling spirits.' A few years ago, the restaurant switched from having a full liquor license to serving just wine and beer. Customers waiting at the bar can sample a 3.5-oz taste, or a full glass of wine. Turback's uses a nitrogen preservation system for opened bottles.

Daily by-the-glass offerings include four whites, one blush, three desserts, and one red. Bar prices average $3.00/glass. Table prices are $1.00 above retail for most bottles, double wholesale plus $1.00 to $5.00 for hard-to-find wines. This price structure helps Turback's move about $225,000 in wine annually.

The real success of the restaurant stems from Michael Turback's vision. In 1977, he got to know the people making Finger Lakes wines and became convinced their talent and commitment would generate great interest in New York wines.

A menu consisting almost exclusively of products grown or made in New York was added to the New York-only wine list. The menu describes many foods that include New York wine in their preparation.

"It was only a matter of time for things to happen," he says. "Now the many people who visit the Finger Lakes region know that Turback's is the place to go for the best in local vintages and locally grown food."

Mansion Hill Inn

Another restaurant, a few hundred miles east of Turback's, also has a wine list made up solely of wines produced in New York.

Steve Stofelano, a former high school teacher, left a legislative assistant job at the state capitol in Albany and opened "Mansion Hill Inn," in Albany, NY. The inn, within one block from the Governor's mansion, is a sturdy Victorian-era building built in 1861. In 1984, renovation turned it into the only bed-and-breakfast inn within Albany city limits.

"I was happy learning about local politics," Stofelano says, "but when I met Gary Dross of Walker Valley Vineyards in the Hudson Valley region, my life took a turn. His vineyard site sat in the path of a planned atom-smasher project. While Gary lobbied against the Lt. Governor's plan, he taught me about vineyards, and the passion that motivates people in the New York wine business. Fortunately, the atom-smasher went to Texas and Gary and I remained friends."

From the start, Stofelano made New York wine central to the success of the restaurant. "I wanted this restaurant to be a place where people get good food paired with great wine. I decided not to apply for a full liquor license. The teacher in me also saw the potential to educate locals about the wines produced in their backyard.

"I had never heard of Michael Turback. But I did know you couldn't find a New York wine in most local restaurants in 1985. Today, Albany is one of the best markets for New York wines."

The wine list is changed every six months. Because the cellar is small, storage contains about 50 different wines, from 15 to 20 wineries. The list has 36 wines, ranging from $12 to $20/bottle, including 11 whites (with six Chardonnays and one kosher Chardonnay/Riesling/Seyval blend), and nine reds (with five Cabernet Sauvignons and one French hybrid). Three blush (one that is organic), and three 'méthode champenoise' complete the printed list, which does not reflect everything in the cellar.

"Quite often," Stofelano says, "a customer will suggest we serve a wine that he or she tasted at the winery. We enjoy the look on a customer's face when we come up from the cellar with that very wine. We stock more than we list — for our wines by-the-glass and for those moments when a surprise is in order.

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"I built good relationships with wineries early on. Many times, this restaurant is the only outlet in Albany for very small wineries whose products are mainly sold within their own wine region. They like what we do and they allot wines to this restaurant."

Stofelano does not view New York wine as a choice between vinifera or French hybrid. He has everything available, continually rotating the selection. When he locates a wine that is special, or in limited supply, he gets all he can afford and can fit in the cramped cellar.

"We stock the unusual or the rare. It gives customers another reason to keep us in mind. We encourage people to experiment. If a customer tries something new, but doesn't like it, we'll take it back to serve by the glass, opening something more suitable for that table."

The wait-staff tastes every wine in the restaurant. They are encouraged to talk up the wines that appeal to them. "If they like something, they are better able to sell it," Stofelano says. "I make sure the staff is exposed to all available literature about wine in general, and New York wine specifically.

"They are taught to offer the wine list along with the menu and to ask, 'Have you selected a wine to go with your meal?' That question goes a long way toward making a wine sale. The unopened bottle placed on every table helps the staff to sell, too. Nearly every customer orders wine."

Mansion Hill Inn seats 40 for lunch and dinner. Most of the traffic is during dinner, serving an average of 40 daily and 85 on weekend nights. The $150,000 in annual wine sales is, "... pretty good for a place so small," Stofelano notes. The pricing policy is double the wholesale bottle price plus $1.00, but no wine is priced below $12/bottle, whatever the wholesale cost. By-the-glass prices average $3.00.

Mansion Hill Inn hosts an educational dinner the second Tuesday of each month featuring a winery and/or distributor representative. New York wines are paired with a special dinner prepared by the chef, David K. Martin, recent winner of an American Culinary Federation award.

"Our customers discover the many fine wines available from New York producers," Stofelano says, "and the almost-symbiotic relationship that exists between those wines and food. Most of all, they learn that Mansion Hill Inn is the place in the capital district for New York wine. The special dinner is good promotion."

The fixed-price dinners, from $25.00 to $35.00, include four courses, each paired with a 3-oz glass of wine. Chef Martin is joined by a winery representative to introduce each course, explaining the preparation and the wine selection. Discussion follows each pairing while the group awaits the next course.

In a time when many restaurants in New York state are having difficulty, Mansion Hill has added more rooms at the inn. Stofelano says, "Our expansion does not include the restaurant — yet — but our success is a direct result of having hitched our star on two things: an award-winning chef and the quality of the local wines." ■

Fermenting Tanks

Dimpled cooling jackets on fermenting tanks from Santa Rosa Stainless Steel carry a high-pressure flow of glycol, freon or ammonia to ensure continuous, precise temperatures of the wine. Low-pressure channel jackets carrying glycol and water also are available. Santa Rosa Stainless Steel is the industry leader in tanks for fermenting, dejuicing and storage. The wine industry has invested in nearly nine thousand of our stainless steel tanks during the last 20 years. Call today for information or free estimates.

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VALUE PRICING — What does it mean?

By Mike Fisher,
Motto, Kryla, & Fisher

Recently, there has been much discussion about the high price of California premium wines. We hear that the number of wine consumers willing to pay high prices is shrinking — that premium wineries need a 'reality check.'

The industry is being forced to lower prices because fewer consumers are willing to pay $15/bottle. The question of whether this is a temporary or permanent situation needs to be addressed.

Many wineries are reacting to this sentiment by focusing on 'value pricing' as a concept for selling their wine. The value-pricing concept plays into the current consumer trends of purchasing few items at full retail.

Wineries approach the value-pricing concept in two ways. The ***first approach*** is to develop a lower-priced brand. For this less expensive brand, the winery produces wines with quality comparable to the original brand (*i.e.*, using coastal grapes, French oak barrels, labor-intensive production, and expensive packaging).

The wines that continue to be bottled under the more expensive original label may have unique characteristics, such as vineyard or 'reserve' designation, but the quality of the wine is similar. This concept is different from the traditional second label approach, in which purchased bulk wine or lower-quality lots are used.

The ***second approach*** is to produce all wine at high quality standards and to promote the winery as a 'value-priced' winery. A tag line such as "high quality wine for everyday consumption" can be promoted easily without explanation.

Practicalities for the winery

Value-pricing is great for the consumer, but what are the economics for the winery?

Because lower pricing produces less revenue, costs must be reduced to make the concept work. Because the winery is selling the idea of higher quality for less money, reducing production costs reduces quality and, as a consequence, is self-defeating.

Distribution and administration expenses lend themselves to some reduction, but not at the magnitude of sales and marketing costs. Reducing traditional sales and marketing expenses is critical to the success of the value-pricing concept. These expenses include: public relations, hospitality, entertainment, travel, marketing materials, commissions, distributor support, payroll, etc.

A value-priced brand can't justify extensive travel, sales reps, elaborate entertainment, comprehensive POS (point-of-sales) materials, or a high-powered PR firm. The wine needs to be sold through guerrilla marketing techniques.

Because a wine is value-priced, and in theory will sell itself, the winery could look to the distributors and the trade to reduce their margins, allowing the winery to receive a higher percentage of the retail price.

A comparison of the economics of value-priced (V) wine versus traditional pricing (T) might be:

	(V)	(T)
Bottle price	$10	$15
Retail/FOB price%	55%	50%
Per Case—FOB price	$66	$90
Programming	—	(5)
Production costs	(40)	(40)
Gross margin	26	45
Sales and marketing	(10)	(25)
Distribution	(4)	(5)
Administration	(5)	(7)
Profit contribution	$7	$8

Some of the cost savings would come from lower expense and others through higher volume.

A fad or a trend?

Is the value-pricing concept temporary, or does it represent a trend which will be a permanent structural change to the industry? We see a number of fac-

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Carlsen & Associates
5228 Aero Drive, Santa Rosa, CA 95403 707/576-0632

tors which offset the consumer trends favoring value-pricing and indicate it may be a temporary phenomenon. These factors include:

- We are in the middle (or at the end?) of a recession, especially in California, which represents 40% of premium wine sales. This recession has been with us for two years and especially has hit white-collar (higher percentage of premium wine consumers) vs. blue-collar workers.
- Restructuring and consolidation of many industries is occurring, raising job security questions for many more employees than actually have lost their jobs. Everyone is less inclined to buy expensive wines; however, recessions historically are cyclical, and the economy will recover.
- The 1989 and 1991 vintages from the North Coast of California were bumper crops (over 30% above the five-year average of 1984/1988) and the 1990 vintage was 10% above average. Demand for premium wine hasn't kept up with the increased supply.
- The media declared the vintages of 1988 and 1989 Cabernet Sauvignon and 1989 Chardonnay as below average. Many consumers of $15 to $20 wines read vintage charts and wine reviews.
- The wild card of phylloxera will have a major effect on grape supply in the mid-1990s. Projections from our last issue of ***MK-F Wine Industry Update*** predicted a 35% drop in Napa and Sonoma grape supply by 1997. Again, supply and demand economics will cause higher wine prices.

Value-pricing can work, but only if sales and marketing expenses are kept to a minimum and volume is high. Those who embrace the value-pricing concept should have the ability to phase out of it without major difficulty if and when the consumer demand for more expensive wine returns. ■

Mike Fisher is a principal of Motto, Kryla & Fisher, Wine Industry Accountants and Consultants, 999 Adams St., St. Helena, CA 94574, tel: 707/963-9222; North & Vine, Healdsburg, CA 95448, tel: 707/431-2200.

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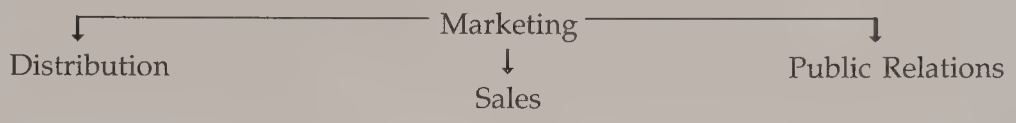
Public relations enhances marketing

By Marshall Newman

Figure 1

Where Public Relations fits



In an enterprise as capital-intensive, competitive, and unforgiving as making and selling wine, public relations may seem of minor importance or consequence. In reality, *because* the wine business is so tough, public relations (or the lack thereof) can be the difference between a winery's success or failure.

Public relations is especially crucial for wineries just starting out. But many of the initiatives new wineries should consider are equally valid for veteran wineries that have lost their public relations edge.

A major reason public relations receives short shrift during winery development is a lack of understanding regarding where it fits. Public relations is an element of marketing, working alongside distribution and sales to bring the product to the marketplace and into the hands of consumers (Fig.1). All three marketing elements — distribution, sales, and public relations — must work together to generate marketing results.

Strategy

For any new winery, deciding on an overall product direction should be an early priority, and the earlier the better. Only after product direction is set can marketing strategy — including public relations — be formulated and implemented. Decisions regarding the wines to be produced and where they will be positioned in the market need to be based on realistic assessment of the winery's capabilities and the projected interest of consumers.

With product direction in place, marketing strategy can be considered. At its most basic, such strategy will include determining product distribution and focusing sales emphasis on certain mar-

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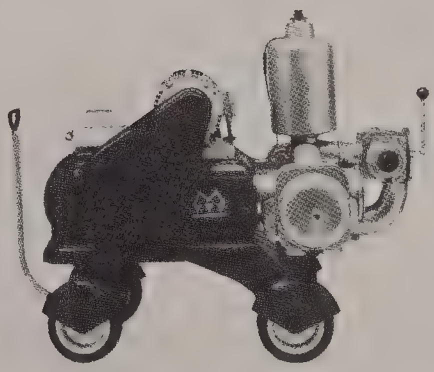

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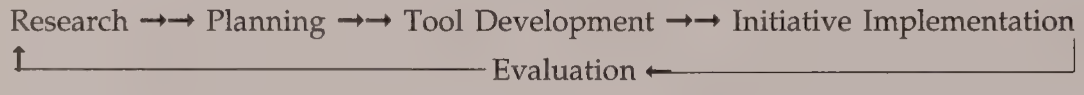
ket segments, such as chain stores or restaurants. Once direction and strategy have been established, a public relations program can be developed.

The development of an effective public relations program follows a six-step (Fig.2) progression:

Figure II

Progression of a Public Relations program



1) Research; determining who should be targeted.

2) Planning; deciding the best ways to reach the target public and creating initiatives based on those decisions.

3) Putting together the tools for those initiatives: press kit, brochure, events, newsletter, tasting program, etc.

4) Execution of initiatives; turning the plans into reality.

5) Evaluation. After an initiative has been implemented for a certain length of time, it should be reviewed for performance, both on its own and as an element of public relations.

Last, and perhaps most important, what is learned in evaluation needs to be applied to steps one and two, enabling the public relations program to evolve based on its successes.

Effective public relations is never a one-shot deal; it is an ongoing process that takes time and attention. Consider these wineries, all of which used public relations in their overall marketing to become and stay successful: Glen Ellen, Arrowood, Robert Mondavi, Fetzer, Sutter Home, Chalone, and Quivira.

While public relations can address many audiences, in the wine business, the primary audience is the consumer and the primary activity is product promotion.

Should a winery create a program aimed solely at consumers? The answer, of course, is no. Every winery has neighbors, home towns, home states, distribution in other states and hundreds of people who sell the wines. All these groups can simplify or complicate the winery's existence. In the public relations mix should be initiatives targeting those whose support is essential to doing business.

The public relations universe

Perhaps it is easiest to view the public relations universe as three concentric circles surrounding the business base, with each of the circles representing a boundary of influence (Fig.3). The objective is to work from the center of that universe outward.

The inner circle of that universe is local, reaching from the winery outward to encompass the county in which the winery is located. From good roads and friendly zoning to fair building permits and understanding neighbors, the local part of the universe has major implications that demand public relations attention. For that reason, it's important to meet the county supervisors, help local

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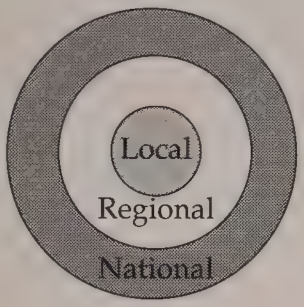
Figure III
The Public Relations Universe



charities, get involved with the local winery organization and host winery events that local residents can attend. Support begets support and wineries need local support to thrive.

The second circle of the universe is regional, which can encompass an entire state like California or two or three smaller states in the East or Midwest. In regional public relations, a winery can utilize winemaker's dinners, wine-tasting events, press releases, press outreach, newsletters, and other activities to develop name recognition and a positive image.

Wine-tasting events are particularly helpful to a new winery, as they provide personal contact with potential customers while introducing them to the wines. De Loach Vineyard (Santa Rosa, CA) recently participated in 40 separate events in a five-month period, which suggests that even successful wineries recognize the importance of this outreach.

The universe's outer circle is national, encompassing the farthest distribution of the winery (except those with serious international aspirations). This is where sending press releases and samples, touring major markets, and working with the traveling press can pay off.

News releases and samples

A new winery should consider the benefits of sending press releases and samples to the media on a release by release and media person by media person basis.

A press release on the winery's debut wine or its first reserve wine is usually well-received because it is news. Unless linked to news or important winery information, press releases on subsequent vintages are often a waste of money, as the media receives a deluge of such releases. The question to ask — and answer objectively — before writing and sending any release is, "Does this release provide information the media is likely to use in a story?" If the answer is no, the release shouldn't be produced.

More than 500 people call themselves wine writers today, but the vast majority of wine coverage comes from a relatively small group of true professionals. Determining which writers deserve attention often requires the help of a public relations professional or a determined review of press clippings.

Samples are even trickier. Lots of wine writers want them, but only about 20 have the review-impact to merit receiving samples. Sending samples can be scary, but one or two great reviews in the right places can sell an entire vintage and go a long way towards establishing a winery's reputation.

The public relations initiatives mentioned here are in common use by wineries, and for good reason — they work. But because many wineries depend on the same initiatives, creative, original approaches often succeed. From Sonoma, CA, Gundlach-Bundschu Winery's clever posters promote with a sense of fun. The media attention given to their "Two bottles a day, that's all we ask" poster simply adds to the program's success.

Keys to success

Developing a positive image and reputation may seem daunting in the face of competition from 700 wineries in California alone. The keys to success in creating and implementing public relations are both simple and universal:

1) A clear understanding and realistic expectation of what can be accomplished.

2) A plan of action that is consistent and in tune with the product's positioning.

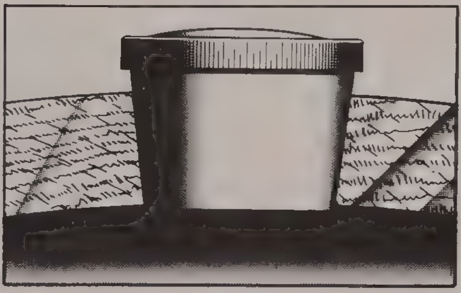
3) Solid effort at every level.

4) Perseverance.

Fortunately, new wineries needn't tackle the universe of public relations alone. Wineries may hire as much or as little public relations help as they need. Public relations agencies are available to handle entire programs, from planning to tracking the results. Writers and designers can create terrific press kits and brochures. Event planners will turn a winery's ideas into memorable occasions.

Wineries shouldn't be afraid to hire public relations professionals and shouldn't be afraid to learn from them.■

Marshall Newman is the proprietor of Newman Communications, a public relations and marketing communications firm based in San Francisco, CA.



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By Dr. Richard Smart

Canopy management — why bother?

Many grapegrowers around the world do not understand why canopy management could be important to them. This is the first in a series of articles to help vineyard managers come to grips with canopy management. Readers may recall the spectacular success of canopy management techniques at Kenwood's Yulupa Vineyard reported in the Jan/Feb'93 **PWV**.

Canopy management techniques are useful in avoiding deep shade in high-vigor vineyards which are now trained on simple trellises. Such vineyards can be found throughout the world. They result from generous supplies of water and often, nitrogen fertilizer, and from pruning severely, to only a few buds.

Vineyards managed in the above manner have shoots which grow quickly, with large leaves and many laterals. Once shoots grow longer than about three feet, they cannot support their own weight. So they fall, one on the other, forming a dense canopy of leaves with the fruit buried deep inside, in the shade.

These canopies are usually bell-shaped, and are typical in vineyards throughout Australia and California. By way of contrast, in many parts of Europe, the vine shoots are trained vertically upward between wires, and then the shoot tips are trimmed. Such a training system is called Vertical Shoot Positioning (VSP).

It is interesting to reflect on why such systems are common in Europe and yet, in California and other New-World vineyards, the canopies are not shoot-positioned. The answer for this probably has to do with climate and diseases. Since the climate of northern Europe is typically wetter and more humid, vineyards there have more problems with fungal diseases.

Vineyards with sprawling canopies would not be successful in northern Europe, as diseases would be impossible to control. Likewise, when the weather turns wet and humid in normally dry climates, diseases are rampant in sprawling canopies. Probably many grapegrowers in California experienced this in 1989, much to their regret!

Shade as the enemy

Sprawling canopies have deep shade in their center, where most of the fruit and leaves are found. Shade is a principal enemy of the grapegrower, yet not all growers realize this fact. Shade causes loss of yield, loss of quality, and more diseases.

The most significant implication of this statement is that both yield and quality can be simultaneously increased by avoiding shade. This idea runs counter to the old yield-and-quality argument. This argument is particularly well-entrenched in Europe, where there is a widespread belief that high yields inevitably lead to lower quality. Many New World winemakers believe this also.

Why should shade decrease grapevine yield? If we think about a grapevine evolving as a climbing plant that fruits only when it reaches light at the top of trees, then the effect of shade on fruiting is obvious. The vine will direct all of its energy to climbing when in the shade, and set fruit only when in sunlight.

Many studies around the world have shown that shade decreases yield and each of the 'components' of yield. Thus, we can expect shaded conditions to decrease percent budbreak,

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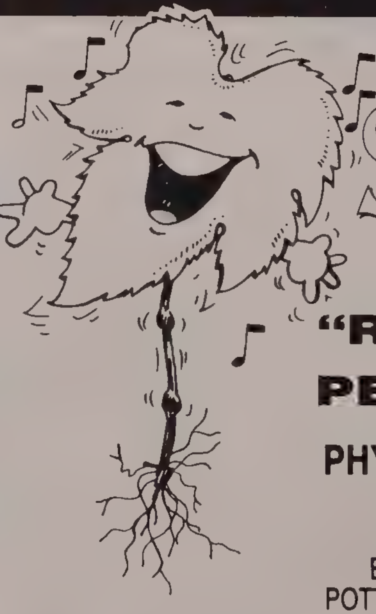

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fruitfulness (or bunches per shoot), fruit set, and berry size.

Vigorous vines get into a vegetative growth cycle that causes them to become more vigorous and yield less and less. Vigorous shoot growth causes shade, which decreases fruiting, and as a result, yield falls. Because of fewer and smaller clusters, the shoots grow even more vigorously, shade becomes worse, and the yield can fall even more. So the vines tend to become more and more vigorous, and yields decline. Growers with vigorous vineyards often tell me about declining yields after the first crop or so.

Shade also decreases potential wine quality. Fruit which develops in the shade has less sugar, skin color, phenolics, and more malic acid, higher potassium, and pH. Varietal flavor is also reduced, and herbaceous or grassy characters increased.

Sauvignon Blanc and Cabernet Sauvignon show this character often. In fact, some wineries have found a market for 'grassy' styles of Sauvignon Blanc. Others prefer a Sauvignon Blanc style which has tropical fruit characters and is associated with exposed grapes. These are all good examples which support the idea that 'winemaking begins in the vineyard.'

Fungal diseases, especially Botrytis and powdery mildew, also increase due to shading. Many researchers have studied these effects, and examples have been found in commercial vineyards. Bright sunlight stops the germination of powdery mildew spores, and this disease is typically only found inside dense canopies.

Botrytis bunch rot usually can be found in the shaded center of canopies, where sunlight and windspeed are reduced, and the bunches do not dry-out quickly after rain and dew. A further consideration that argues for open canopies is that sprays do not readily penetrate dense canopies, and it is thus very difficult to control disease in the canopy center.

Reducing vigor

After reading this far, it should be obvious that shade causes loss of yield and quality for many vigorous vineyards. Maybe some readers are thinking that this sounds like the problem with their vineyards, but what can they do about it?

Some growers may be able to reduce vigor by say controlling irrigation, but this tactic will not work where soils are deep, or in those regions that have summer rainfall. Certainly fertilizers (especially nitrogen) should be withheld in overly vigorous vineyards, but again this will be ineffective on deep and fertile soils.

Grass cover crops are useful to reduce vigor, because they compete with the vines for both water and nitrogen. Some growers mistakenly think that severe winter pruning and suckering will reduce vigor, but in fact the opposite is the case. However, a general problem exists with management strategies which avoid shade by reducing vigor: Yield also will be reduced. But there is a way to avoid shade and to benefit from potential increases in both yield and quality: canopy management.

It may be said that canopy management is a remedial system, to be used when management mistakes have been made. Such mistakes include planting vineyards on soils that are too deep and fertile, or perhaps irrigating and fertilizing excessively.

Canopy management consists of a series of techniques to avoid shade, and they can be divided into 'band-aid' and 'permanent' fixes. Examples of the band-aid approach are leaf-pulling and shoot-thinning. Permanent changes include trellis system modification.

I believe that the adoption of canopy management techniques in the next two decades will do as much to improve wine quality as has the widespread adoption of refrigeration during fermentation.

Future columns will concentrate on how problem canopies can be diagnosed, and how the problems can be overcome. While the first few columns in this series will concentrate on canopy management, other interesting aspects of viticulture will be covered that I see during my travels. ■

Dr. Richard Smart conducts an international viticultural consultancy from Port Macquarie, Australia. He spends several months of the year in the U.S. and can be contacted through his Healdsburg, CA office at 707/433-8875.

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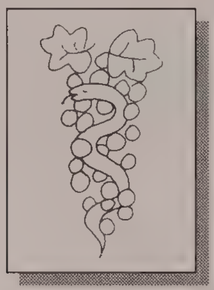


By Andrew L. Waterhouse
Assistant Professor of Enology
University of California, Davis

Exploring the mystery of resveratrol

There is much speculation about the cause of the "French Paradox," the lower-than-expected cardiac disease mortality among wine drinkers in Toulouse, France, reported in Reynaud's ***Lancet*** study. While some objections have been raised regarding its significance, other studies clearly point to a real reduction of cardiac disease in moderate drinkers, and a greater reduction of the disease's occurrence in wine drinkers.

In addition, a comparison of alcohol and wine consumption suggests that red wine reduced platelet aggregation and increased HDL-cholesterol. With so many indications that moderate wine drinking can have real health benefits, the question is: What could be causing it?

In 1990, Leroy Creasy, a plant physiologist, was studying the grape vines' resistance to fungal infections. He discovered that the phytoalexin resveratrol (one of the vine's primary weapons in fighting fungi), was also a constituent (as the glucoside, called polydatin) of an Asian medicinal herb, *Polygonum cuspidatum.* (It also is known commonly as Japanese knotweed or Mexican bamboo.)

Japanese and Korean scientists have studied resveratrol and polydatin and found, in a few lab studies, that this chemical has some desirable effects. For both resveratrol and polydatin, these effects include reducing liver damage from oxidized oil, inhibiting ara-chidonate oxidation, and reducing platelet aggregation.

Resveratrol is a stilbene derivative, and the name comes from the plant where it was first observed, *Veratrum grandiflorum.* For those of you who, like myself, find it hard to visualize a chemical without seeing its structure, see Fig. 1.

Searching for answers

To truly assess the potential health impact of resveratrol, several questions need answers:

1.) What is the average level of this chemical in wine sold in the U.S., and in France — in particular in the Toulouse area where the abnormally low cardiac disease rate is observed?

2.) How can the grapegrower and winemaker affect the levels of res-veratrol in grapes and bottled wine?

3.) How effectively is this material absorbed from wine and other food products?

4.) What other important biological effects might this chemical have that could affect cardiac disease, and might these other effects occur with the doses of resveratrol available in wine?

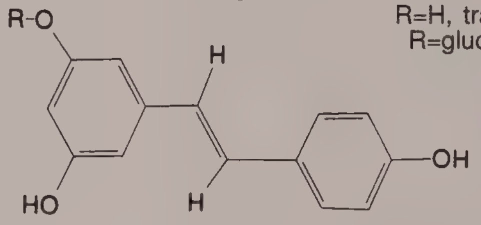
5.) Perhaps most importantly, could other chemicals in wine produce the effects observed as the 'French paradox?'

Our laboratory at U.C. Davis has initiated several studies to address these questions. We have developed a relatively rapid analytical method and, to create even faster methods, are collaborating with other labs interested in resveratrol.

To test our method, we looked at 12 1989 California North Coast wines. We found levels from 0.6 ppm to immeasurable levels, with many wines about 0.2 ppm. These results suggest that winemaking techniques can affect the retention of resveratrol in the wine. To determine the level of resveratrol in commercial California wine, we are analyzing a large sampling by asking California wineries to send us bottles of wine for resveratrol analysis.

We are studying how certain winemaking techniques can affect resveratrol levels, (suggested by our preliminary findings). To do these studies, we have prepared synthetic resveratrol, identical to the natural material. This synthetic material also is being used as a standard to improve analytical methods and testing for biological effects, mentioned below.

Figure I



R=H, trans-resveratrol
R=glucose, polydatin

The fungal connection

The vine produces resveratrol in leaves to stop fungal infections. It is produced only in response to such an infection, and only in the immediate vicinity of the infection. It is easy to visualize resveratrol under these circumstances. With a black light, you can see a ring of glowing, blue fluorescent resveratrol around *Botrytis* infections on a leaf.

Many attempts have been made to correlate varietal production of resveratrol with resistance to fungi. But these have met with mixed success, due to the difficulty in duplicating the same level of fungal infection in multiple vines.

Recent studies in two European labs have focused on lab cultures of *Vitis* in order to control the plant's exposure to fungi. They now have shown clear correlation between a specific variety's ability to produce resveratrol and that variety's established resistance to fungi. These results should allow for reliable, quick testing of a new selection's fungal resistance.

Compared to the extensive study of the vine, the production of resveratrol in the grape has received little investigation. Again, the grape appears to produce resveratrol in response to fungal infection and other stresses; little, if any, is found in the absence of stress.

Resveratrol appears only in the grape skin. One very important finding is that the grape's ability to produce the chemical decreases during ripening. So, between veraison and maturation, the amount of resveratrol induced by stress decreases by 90%. Clearly, grapes harvested early and under the stress of a fungal attack would have more resveratrol present than the same grapes grown to ripeness in a dry climate. One study that we are planning will look at methods to control and induce resveratrol in the grape without having a fungal infection.

Several other recent developments carry significant importance. The enzyme that makes resveratrol, stilbene synthase, has been identified in the vine. The identification has made it possible to show that this enzyme is produced in response to a fungal infection, and is absent without it. In fact, in stressed cells, nearly all other enzymes seem to disappear in favor of stilbene synthase. The result of this shift in chemical production results in such high resveratrol levels in leaf cells near *Botrytis* infections, that these cells die from necrosis.

Another pertinent development is that the gene to produce stilbene synthase has been cloned from groundnut into tobacco. (Resveratrol and related stilbenes are produced in many diverse plants.) This has important implications — it may be possible to incorporate this gene and control it in other organisms, such as yeast.

On the other hand, it may be possible to alter the way stilbene synthase is expressed in grape vines. This means that eventually it may be possible to exercise arbitrary control over resveratrol production in the vine.

A very important variable in the resveratrol equation is the biological effect. The published information on polydatin and resveratrol suggests many unanswered questions. We currently are collaborating with three laboratories to see if resveratrol can affect the oxidation of LDL or HDL production; preliminary data is very promising. If it is effective in these tests, then it is very likely that resveratrol has real cardiac disease benefits. Many phenolic compounds, including some found in wine, are established anti-cancer agents, and it is possible that resveratrol could have similar effects.

Securing interest

Resveratrol already has engendered a lot of interest outside the wine business, both in the health and food sectors. Our synthesis studies and initial survey of California wines was made possible by funding from a drug company which sees potential in the health market.

In the future, we plan to focus on the winemaking and viticultural aspects of resveratrol as much as possible. We will also study the other chemicals in wine which potentially have similar potential health benefits. If we can show that wine contains natural products which do reduce disease, then we truly can recommend a glass for what ails ya! ■

Bibliography

M. Seigneur, et.al., "Effect of the Consumption of Alcohol, White Wine, and Red Wine on Platelet Function and Serum Lipids," ***J. Appl. Cardiol.***, 5 (1990) 215-222.

S. Reynaud, and M. de Lorgeril, "Wine alcohol, platelets, and the French Paradox for Coronary Heart Disease," ***Lancet***, 339 (1992) 1523-1526.

P. Jeandet, R. Bessis, and B. Gautheron, "The Production of Resveratrol by Grape Berries in Different Developmental Stages," ***Am. J. Enol. Vit.***, 42 (1991) 41-46.

R. Hain, B. Bieseler, H. Kindl, G. Schroeder, and R. Stoecker, "Expression of a stilbene synthase gene in *Nocotiana tabacum* results in synthesis of the phytoalexin resveratrol," ***Plant Molec. Biol.***, 14 (1990) 325-335).

E.H. Siemann and L.L. Creasy, "Concentration of the Phytoalexin Resveratrol in Wine," ***Am. J. Enol. Vitic.***, 43 (1992) 49-52.

M.T. Huang, C.T. Ho, and C.Y. Lee, "Phenolic Compounds in Foods and Their Effects on Health II, Antioxidants and Cancer Prevention", ACS Symposium Series vol. 507, American Chemical Society, Washington DC, 1992.

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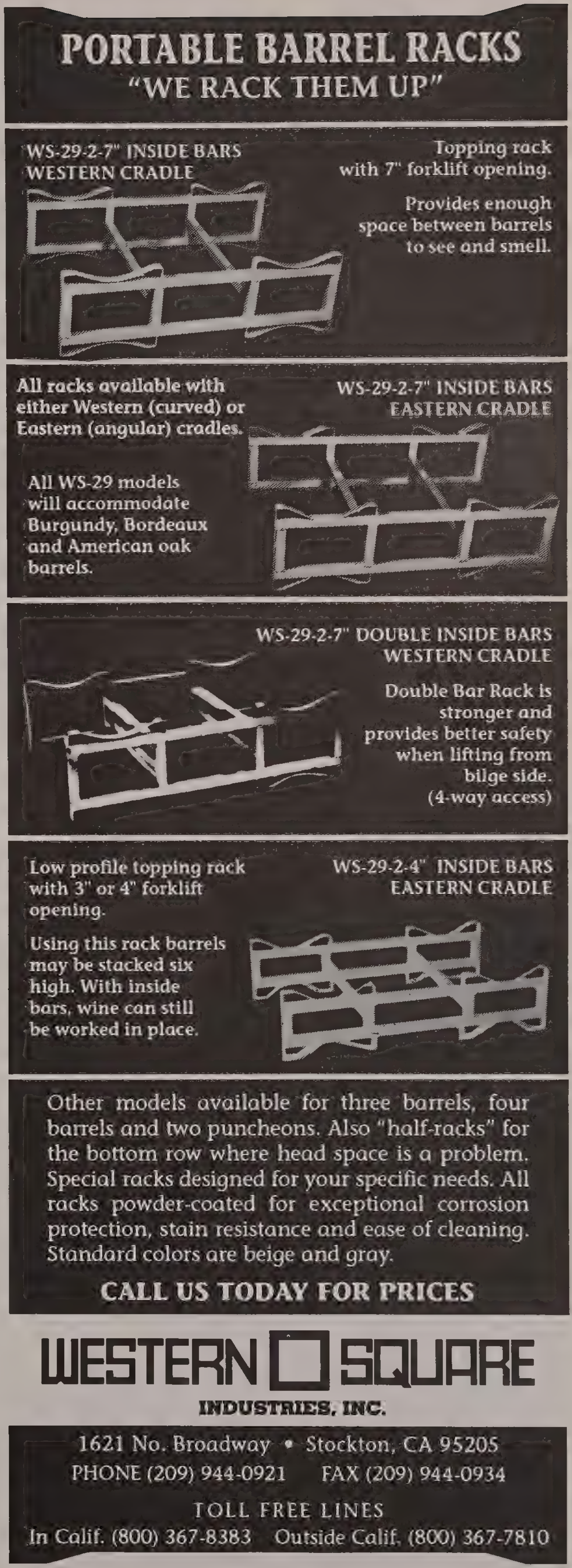

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By D.R. Storm, PhD, P.E.

Frozen water trivia; what an ice cube!

The little-known federal joint-agency group, the Navy-NOAA Joint Ice Center (JIC), recently issued a warning report to mariners. It described the location and northerly migration of what only can be called a floating mini-continent. The JIC has been tracking the super-berg, called A-24, for five years and 2,400 nautical miles.[1] *Its impressive dimensions were a Rhode Island-size, 46 x 52 miles, before it began breaking up in warmer waters off the tip of South America.*

As every grade-school student learns, ⅔ of an iceberg's mass is submerged, giving A-24 an impressive volume of water equal to twice the volume of Lake Erie.[1] *JIC further reported that smaller pieces of A-24, called 'growlers' (big as an aircraft carrier), and still smaller 'bergy bits', had split off and were dangerous objects to all ocean vessels.*

I am surprised that some imaginative promoter didn't claim salvage rights and sell large pieces of the solid-state water to drought-stricken California. Or hawk the smaller chunks to keep in home freezers as a piece of Antarctic history. Before it melts, maybe a large fleet of zambonies can create the world's largest skating surface and produce a candidate for the ***Guiness Book of Records****.*

Sanitation, steam, and hot water

Part I

One of the most important winery-water utility sub-categories is the production, distribution, and application of steam, hot water, and other cleaning agents to provide the environment for consistent and microbiologically stable wine production.

For nearly 30 years, the Wine Institute's ***Sanitation Guide for Wineries*** was the industry's reference source on the subject.[2] The publication is no longer available, according to the publishers.[3] The bibliography of this column includes some more recently published general sources of food sanitation technology, which, in principle, can apply fully to the wine industry.

Winery sanitation principles

Every enology student who, by prudent curriculum planning or by accident, finds himself or herself on the business end of a hose during a crush internship is practicing the simplest form of sanitary technology, *i.e.*, washing and rinsing. Squeaky-clean winery spaces and equipment are a prerequisite to making gold-medal wines year after year.

Both dry and wet cleaning methods are employed. (While I have never observed their use in wineries, wet-dry industrial vacuums are used in some facilities for solids pickup prior to washdown.) The author's observations in wineries in France and Spain suggest that compressed air is also often used to consolidate gross solids prior to wash down. Water scarcity and wastestream reduction were both given as justification for the chosen cleaning methodology.

The use of squeegees has two benefits: 1) pre-washdown, gross solids can be consolidated for removal as solid waste; 2) post-rinsing, the squeegee removes the film of water which remains after washdown, reducing to near zero the chance for accidental slips on wet floors.

Portable, high-pressure washers (introduced in the late 1970s), are also used effectively. A lower volume of water is required than the 45 to 50 psi standard ¾-inch to one-inch hose systems. These units are discussed in detail under the "Portable systems" subsection below.

As preached and pleaded in this column over many years, the capture and disposal of gross solids from the floor can and does remove a potentially large component of solids from the process wastewater stream. This is always a desirable goal. Vacuum, squeegee, or basket-strainer in the floor drain system are methods used singly or in combination to convert potential liquid-borne solids to semi-dry waste that is more readily disposed of.

In those wineries that have adopted a water conservation ethic and where it is now SOP (standard operating procedure), a reasonable balance has probably been struck between enough wash and rinse water for effective cleaning, while as the same time, saving precious potable water. This simple operational scheme also reduces hydraulic loadings on process wastewater conveyance, treatment, disposal systems, and sub-systems, making it a triple-headed benefit.

There is an indisputable winery cleaning hypothesis, which simply states that newer wineries are easier to keep clean than older ones. Glass-like concrete floor and wall paints (epoxy, linear polyurethane, and acrylic) have simplified winery sanitation tasks.

In the design and layout of pre-1970 wineries, little if any thought was given to providing surfaces in tank and barrel spaces for cleaning access and surfaces to which solids would not adhere. Bare, porous concrete was often the surface finish standard. Excellent paints have evolved which allow the conversion of microbiologically attractive floor and walls to easily sanitized, impermeable, architectural finishes.

Current volatile, solvent-based paints will likely disappear from the marketplace before the end of the century. Water-based epoxies and acrylic coatings are already available in advance of the Environmental Protection Agency's eventual mandate for cleaner air and non solvent-based paints and coatings.[4]

Wineries generally are much easier to clean than some other categories of facilities that produce food and beverages. Oils and fats, which require emulsification for removal, are absent except possibly for hydraulic oil spills and leaks from forklifts and other hydraulically-assisted equipment. In fact, grape-associated carbohydrates and alcohol are probably the easiest process residuals to solubilize and remove.

Tartrate deposits in tanks and barrels are the most troublesome compounds with which a winery has to cope. Mold growth on the exterior of cooperage virtually can be eliminated, if the winery elects to use an anti-mildew/mold coating that is available for treating oak barrels and uprights.

In the author's experience, the split among wineries between anti-mildew coating use and non-use for cooperage is about 50-50. While the most commonly used commercial product, "Mildew-cide," is listed on the California toxic substances Material Safety Data Sheets (MSDS), its use in wineries is not prevented. (Barrel Builders, through Roy Anderson Paint Co., kindly provided the technical data on Mildewcide.[5])

Clean In-Place systems (CIP)

Fixed stainless steel wine transfer lines, wine fermenters, and storage tanks can be cleaned effectively in-place. The process can involve the use of caustic cleaners, disinfectant solutions, and rinse water.

Permanently fixed or portable spray balls are used for tanks. With the proper number, and location of balls and ball orifice size and 50 to 60 psi (pounds per square inch) pressure, the system can evenly distribute the chemical cleaner-disinfectant solution and rinse water. The very simple systems can utilize one of the winery's transfer pumps connected to a permanently mounted solution tank or small wine blending tank.

Transfer hoses can be used to make the necessary connections from solution tank to pump to tank being cleaned. Timers on the pump control panel allow a preset interval to be set for recirculation and the proper solution contact time. With such an arrangement, a cellar worker can perform other tasks while the cycle is completed.

Fixed CIP systems have single-purpose, fixed location pumps. Portions of the solution delivery system can utilize the fixed, stainless steel wine transfer pipe systems that have hose connections for each tank. This system can be operated from a master controller, which in the most high-tech systems can change source tanks and perform multiple tank cleaning with very little supervision.

The wine production supervisor generally chooses which cleaning compounds to use in CIP systems, based upon his or her experience with cleaning effectiveness and cost. If the winery is reclaiming and reusing the process wastewater for vine-

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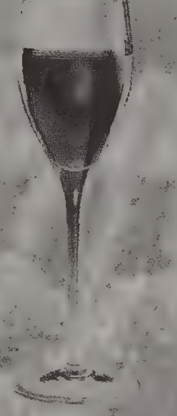

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yard or landscape irrigation purposes, It might be prudent to use a cleaning compound without chlorine. Also, the sodium-based caustics can add undesirable sodium-ion to the reclaimed wastewater stream. Potassium hydroxide-based caustic compounds, while more expensive, appear to be more viticulturally acceptable.

The overall water quality of the reclaimed irrigation water should be examined concurrently with the decision to use non-chlorine or potassium-based cleaners. This will help determine if the net increase in sodium or chloride-ion to the irrigation supply from cleaning operations is significant.

Portable cleaning systems

In the mid-1980s, portable, high-pressure washers made their entrance onto the industrial maintenance stage. With end of delivery-wand pressures of 4,000 to 5,000 psi, the pure physical cleaning power of the stream approaches the cleaning effectiveness of a compressed air sand-blast unit. A whole host of commercial and industrial activities have embraced this equipment for heavy-duty cleaning chores.

Like their first-generation cousins, the portable hot water/steam cleaners were made famous in most wineries 20 years ago as the only method (short of hand wire-brushing) for stubborn tartrate removal. These steamers also come with an optional detergent tank which injects an emulsifying compound into the stream for vehicle engine and chassis cleaning.

The high-pressure washers can use hot water, although the source must be external (winery hard-piped hot water) to the washer. The portable steamers, on the other hand, come with either kerosene-fired or electric-resistance heater-fired boilers. The use of kerosene boiler units is limited in closed winery spaces.

For small wineries (under 25,000 cases/year), a good argument can be made for portable units. Larger installations can justify the initial cost of a fixed boiler and permanent piping for hot water and steam needed for sterilizing bottling equipment.

Part II of this series will discuss: • Sanitizing protocol for wineries. • Boilers and boiler-water quality considerations. • Winery interior design tips for reducing sanitation problems. ■

David Storm is a Consulting Civil and Sanitary Engineer and owner of Winters Winery.

References

1. Iceberg Journey Ending in Bits and Pieces, May 1992, Sea Technology.
2. Sanitation Guide for Wineries, 1961, Davison, Almond D., Wine Institute, San Francisco, CA.
3. Personal communication 1992. Wine Institute Librarian, San Francisco, CA.
4. A New Generation of Water Based Coatings, 1992, AIPE Facilities, August 1992.
5. Material Safety Data Sheet, July 7, 1992. Protective, Clear Wood Finish, R-X650, Mildewcide. Roy Anderson Paint Co., San Francisco, CA.

Bibliography

a. Food Plant Sanitation. 1990. Gould, Wilbur A., CTI Publications, Baltimore, *MD*.
b. Engineering for Food Safety and Sanitation, 1984. Imholte, Thomas J., Technical Institute for Food Safety, Crystal, MN.
c. Food Engineering Systems Vol. 1, 1976. Farral, Arthur W., AVI Publishing Co., Westport, CN.
d. Sanitation, Safety and Environmental Standards, 1983. Minor, L.J., AVI Publishing Co., Westport, CN.

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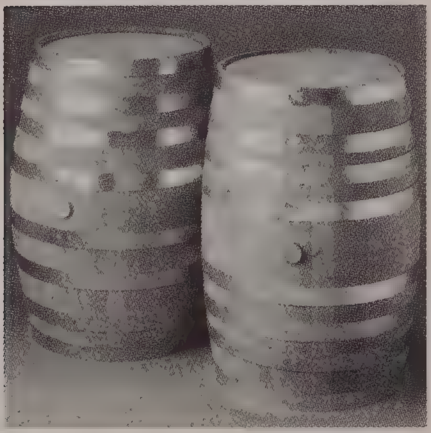

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By R. Corbin Houchins

Changes in federal law

Almost logical label rules

It's not too early to consider whether next year's changes in terminology used by the Bureau of Alcohol, Tobacco & Firearms (BATF) in Part Four (Regs-4) of its regulations will affect your labels.

I must admit to a modicum of regret at losing an example of governmental illogic that always produced amusement at lectures. Effective July 27, 1994, *making* wine and *producing* wine will mean the same thing. Wineries claiming to have 'made' wine which was 90% bulked in will have to change either their practices or their label copy. Have a look at the third quarterly BATF Bulletin for 1992 for details.

Embarrassingly, the only real wine label howler that will remain in Regs-4 was introduced not by a bureaucrat, but by lawyers. The assignment was to find a word that would suggest that wine was made at the client's premises when it was not. "To vint" is not a verb you will find in any standard dictionary. However, Regs-4 accepts the non-existent participle 'vinted' as a synonym for cellared. Thus, under the new regulations, to vint a wine is to subject it to any of the cellar treatments set forth in Reg-4.22(c), which can be as little as a final filtration.

The judge steps in

A more important change was made in October 1992 by the Court of Appeals in Washington, D.C.

The subject is promotional gifts to retailers. The case, decided last fall, confirms a trend which amounts to a major change in the way federal 'tied-house' laws affect promotional activity.

Since Repeal, the Federal Alcohol Administration Act (FAAA) has forbidden suppliers to make promotional or sales incentive gifts to retailers, if the result is exclusion of a competing brand from interstate commerce. The federal enforcement agency has long interpreted 'exclusion' of a competing brand to include making a sale that would otherwise have gone to a competitor.

Because it is practically impossible in most cases for a supplier to show that sales resulting from the gift did not replace sales from another supplier operating in interstate commerce, the effect of the broad regulatory inter-pretation of exclusion was to forbid promotional gifts to retailers in all U.S.

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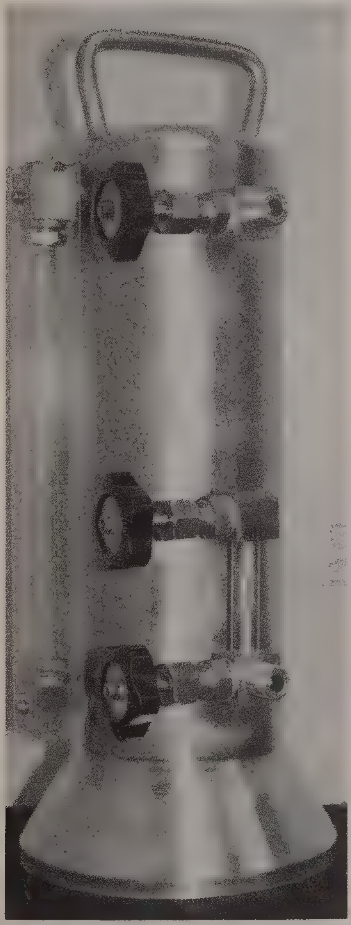

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markets. Thus, there has been a nationally uniform baseline for trade practices, even though state tied-house laws dealing with the same subject matter differ considerably.

For some time now, the Bureau's broad use of the FAAA to restrict competition has been under attack. In 1980, the D.C. Circuit Court required the Bureau to stop treating deep discounts that were lawful under antitrust law as violations of the FAAA. In 1988, another federal circuit court refused to find a supplier in violation of the FAAA for paying retailers to advertise in their publication, so long as other suppliers were not literally excluded.

The latest case carries on the narrower definition of exclusion. However, the decision goes even more to the heart of the federal enforcement policies that have set licensed beverages apart from other packaged goods in the regulation of competition. It involves a common form of sales promotional activity, gifts to retailers.

The facts may sound shocking: A wholesaler offered retailers consumer goods, including television sets and VCRs, of value depending upon how much of the product the retailer agreed to buy. As of October 1992, however, the shock value comes from state tied-house laws, not federal, so long as the retailer does not agree to shut out other suppliers.

Back to state by state

Before Prohibition, wine sales practices were mostly a question of state law.

With Repeal, the states remained free to regulate the product, but federal statutes were applicable as well. The trade grew used to federal restrictions as a more or less uniform guideline to what is permitted.

The first effect, then, of reducing the extent of federal regulation, is to emphasize the differences among state tied-house laws. Exclusion is generally not a concept found at the state level. The typical scheme is to forbid all gifts, except for a list of exceptions, but the wording varies too much among the states to permit generalization.

For the present, wineries and their suppliers will have to look at each state to determine whether sales promotions can be fashioned to work within applicable statutes and regulations. New state regulatory enforcement policies are also likely to appear, as federal oversight become less significant in policing the marketplace.

My guess is that in states where relatively free promotional activity is lawful the distributor trade associations will seek changes to bring back the status quo ante. Until that happens, it should be an interesting time for creative marketers. ■

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Marketing's deadliest enemy

By Jay Conrad Levinson

About 80% of business that is lost in America is lost due to **apathy after the sale.** Poor quality doesn't lose those sales. Shoddy service doesn't lose them either.

The potential for generous profits spanning decades is down the tubes because of a "love 'em and leave 'em" attitude that characterizes most American businesses. Hey, listen up: Marketing isn't over when the sale is made. That's when marketing **begins.**

If you comprehend this simple truth — no degree in rocket science necessary — you can prevent apathy from ever setting in. You cannot only hold on to your valuable customers (and every single one of them is valuable), but you can gain repeat business from them year after year. And you can obtain referrals from them at the same time. Plus there's the word-of-mouth advertising they'll do for you; a kind of marketing you'll hear little about, but profit mightily from.

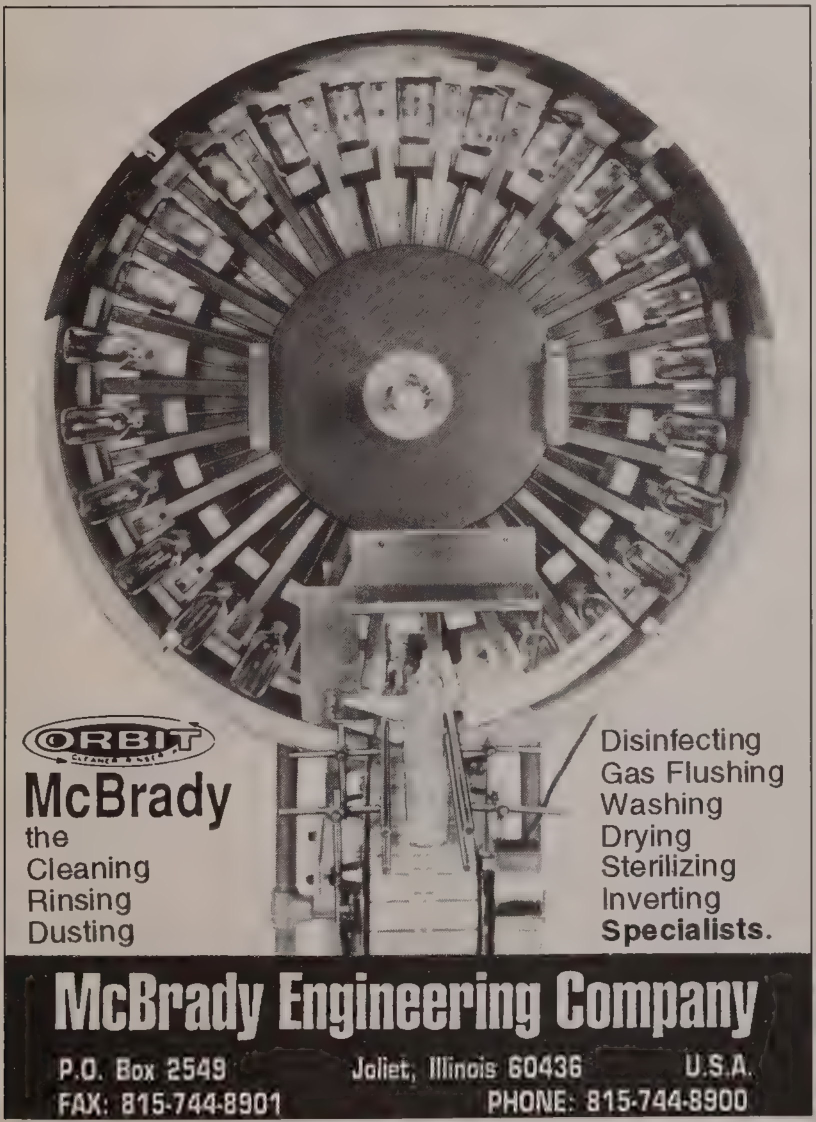
Get this straight: The deadliest enemy of marketing is **apathy**. The opposite of apathy is **follow-up**. The not-so-hidden meaning is that many firms fail because they don't follow up. How exactly does the guerrilla follow-up?

The follow-up strategy

First, of course, the guerrilla follows up according to a **preplanned** strategy, so that crucial follow-up need not be improvised along the way. A first-rate guerrilla follow-up strategy might guide the marketing to:

1. Send a thank-you note within 48 hours of the first sale. Sign that note in ink. Have a P.S.
2. Send a one-page letter or a postcard within one month of the contact. Ask if the customer is satisfied with the purchase and if there are any questions you might answer.
3. Send a one-page letter plus an accompanying piece within three months of the contact. Alert the customer to related products or services you offer. This is a good time to engage in fusion marketing — tie-ins with others.
4. Send a one-page letter plus an accompanying piece within six months of the first contact. Ask the customer for the names of three people who might benefit from your products or services. Provide a simple form and a postpaid return envelope. Express gratitude.
5. Send a letter or postcard within nine months of the contact. Enclose a customer questionnaire; assure confidentiality, and ask a lot of questions.
6. Send a card on the one-year anniversary of the person or company becoming a customer of your winery. You might even enclose a gift.

Such a program would result in repeat sales, referral business, word-of-mouth recommendations, and increased profits for you. The cost? Just a little more than zilch. The return-on-investment is incredibly high for caring, conscientious customer follow-up, and the investment is tiny. So why don't more win-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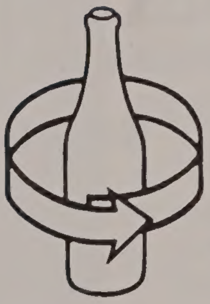

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